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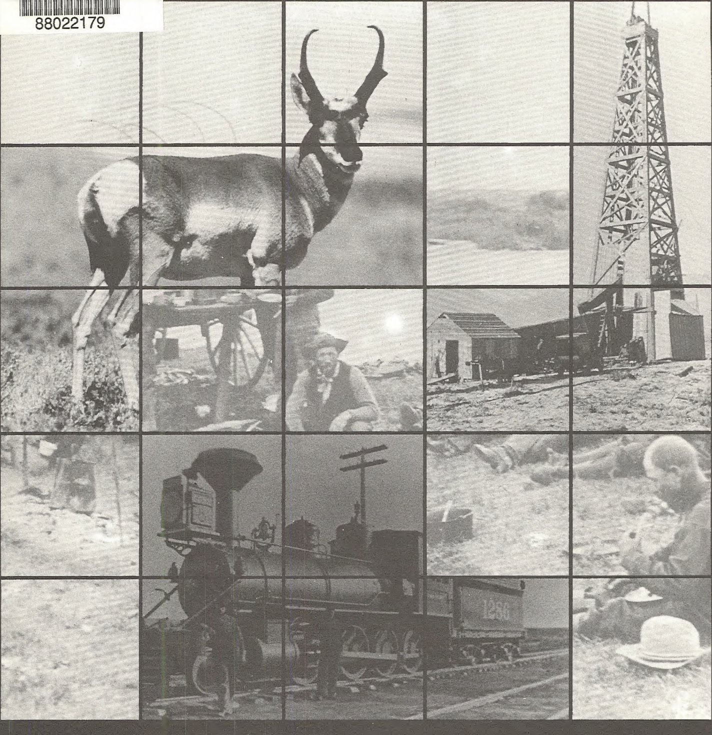

MEDICINE BOW-DIVIDE Resource Areas

Resource Management Plan

Draft Environmental Impact Statement

Purpose and Need - Alternatives - Affected Environment - Environmental Consequences - Consultation and Coordination

DRAFT
Resource Management Plan
and
Environmental Impact Statement
for the
Medicine Bow and Divide Resource Areas
Rawlins District, Wyoming

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Type of Action: Administrative

Jurisdiction: Albany, Carbon, and Laramie counties and portions of Sweetwater County, Wyoming

Abstract: This document addresses alternatives for managing federal land and federal mineral estate in south central and southeastern Wyoming. The area covered comprises 4 million acres land in which surface and minerals are federally owned and 1 million additional acres in which only the minerals are federally owned ("split estate"). This public land is administered by the Medicine Bow and Divide resource areas, Rawlins District, Bureau of Land Management. The plan focuses primarily on three resource management issues relating to resource uses that affect vegetation, soils, and watershed values; suitability of areas for special management designations; and opportunities for improving resource accessibility.

Four alternatives that address each issue have been considered: continuation of present management (Alternative A) and three other alternatives that provide a range of choices ranging from restricting management actions or development to actively mitigating the effects of resource management actions or development. Alternative D, the preferred alternative, is a combination of Alternatives A, B, and C. The four alternative plans presented in chapter 2 focus on allocating resources among the uses and prescribing general management actions that would be taken. The various impacts that would be expected from implementing each of the alternatives are analyzed in chapter 4.

When this document is produced in final form, it will provide a comprehensive framework for managing and allocating resources on the public land in the Medicine Bow and Divide resource areas. Further information regarding this draft RMP/EIS can be obtained from the addresses below. Comments will be accepted for 90 days following the date that the Environmental Protection Agency publishes the notice of filing of this draft in the *Federal Register*. Comments should be sent to the following address.

John Husband, Team Leader
Bureau of Land Management
Rawlins District
P.O. Box 670
Rawlins, Wyoming 82301
Telephone: (307) 324-7171

Cover photos courtesy of Carbon County Museum and Wyoming Game and Fish Department.

IN REPLY REFER TO:

March 3, 1849

United States Department of the Interior

Bureau of Land Management
Wyoming State Office
P.O. Box 1828
Cheyenne, Wyoming 82003

February 1987

Dear Reader:

Enclosed for your review and comment is the *Draft Resource Management Plan/Environmental Impact Statement for the Medicine Bow and Divide Resource Areas*. The alternatives in this document have been designed to resolve land management issues that were identified in the early stages of the planning process. The environmental consequences of implementing the alternatives also are analyzed in the document.

Your comments are invited on the alternatives presented and on the adequacy of the impact analysis. A 90-day comment period will begin with the date the Environmental Protection Agency (EPA) publishes the filing of this draft document in the *Federal Register*. Please direct your written comments to John Husband, Team Leader, P.O. Box 670, Rawlins, Wyoming 82301.

You should retain this draft resource management plan/environmental impact statement (RMP/EIS) because it is possible that the final RMP/EIS will be published in abbreviated form. If that occurs, you will need this document for reference.

Comments on the alternatives and on the adequacy of the impact analyses will be fully considered and evaluated in development of the final RMP/EIS. Through your participation in this effort, we can move forward together toward a common goal of improved public land management in the Medicine Bow and Divide resource areas.

Sincerely,

Hillary A. Oden

Hillary A. Oden
State Director

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DRAFT

RESOURCE MANAGEMENT PLAN/ENVIRONMENTAL IMPACT STATEMENT for the MEDICINE BOW AND DIVIDE RESOURCE AREAS RAWLINS DISTRICT, WYOMING

Prepared by:

U.S. Department of the Interior
Bureau of Land Management
1987

Hillary A. Oden
Wyoming State Director

4-13-87
Date

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ABBREVIATIONS

[Note: Many of these terms are further defined in the Glossary.]

ACEC	Area of critical environmental concern
AMP	Allotment management plan
APD	Application for permit to drill
APHIS	Animal and Plant Health Inspection Service, U.S. Department of Agriculture
AUM	Animal unit month
BLM	Bureau of Land Management, U.S. Department of the Interior
BOD	Biochemical oxygen demand
BuRec	Bureau of Reclamation, U.S. Department of the Interior
"C" allotments	See the Livestock Grazing appendix
CEQ	Council on Environmental Quality
cfs	Cubic feet per second
C&MU	Classification and Multiple Use Act of 1964
CFR	Code of Federal Regulations. Numbers refer to title and part; that is, 40 CFR 1500 refers to title 40, part 1500.
CRMP	Cultural resource management plan
dbh	Diameter at breast height
DEQ	Department of Environmental Quality, Wyoming
EA	Environmental assessment
EIS	Environmental impact statement
EPA	U.S. Environmental Protection Agency
FCC	Federal Communications Commission
FCLAA	Federal Coal Leasing Amendments Act of 1976
FLPMA	Federal Land Policy and Management Act of 1976
FS	Forest Service, U.S. Department of Agriculture
FMP	Fire management plan
gpm	Gallons per minute
GS	Geological Survey, U.S. Department of the Interior
HMA	Herd management area (for wild horses)
HMP	Habitat management plan
"I" allotments	See the Livestock Grazing appendix
KGS	Known geologic structure
KRCRA	Known recoverable coal resource area
"M" allotments	See the Livestock Grazing appendix
MBF	Thousand board feet
MFP	Management framework plan
mg/l	Milligrams per liter
MMBF	Million board feet
MSA	Management situation analysis

ABBREVIATIONS (Continued)

NAAQS	National ambient air quality standards
NEPA	National Environmental Policy Act of 1969
NNL	National natural landmark
NWPS	National Wilderness Preservation System
ORV	Off-road vehicle
PRIA	Public Rangelands Improvement Act of 1978
PRLA	Preference right lease application
PSD	Prevention of significant deterioration
R&PP	Recreation and public purposes
RMP	Resource management plan
RPS	Rangeland program summary
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SCS	Soil Conservation Service, U.S. Department of Agriculture
SHPO	State Historic Preservation Office (or officer)
SMCRA	Surface Mining Control and Reclamation Act of 1977
SRMA	Special recreation management area
T&E	Threatened and endangered species
TDS	Total dissolved solids
TSP	Total suspended particulates
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFWS	U.S. Fish and Wildlife Service
VRM	Visual resource management
WAAQS	Wyoming ambient air quality standards
WGFD	Wyoming Game and Fish Department
WSA	Wilderness study area

SUMMARY

INTRODUCTION

Background

This draft resource management plan/environmental impact statement (RMP/EIS) addresses options for the future management of federal land and federal mineral estate administered by the Medicine Bow Resource Area and the Divide Resource Area, Bureau of Land Management (BLM). The area covered comprises 4 million acres of land in which surface and minerals are federally owned and 1 million additional acres in which only the minerals are federally owned ("split estate").

The Medicine Bow and Divide resource areas encompass BLM-managed public lands in four counties: Albany, Carbon, Laramie, and portions of Sweetwater County (see map 1).

When completed, the Medicine Bow and Divide RMP will provide a comprehensive framework for managing and allocating public land and resource uses in the planning area (Medicine Bow and Divide resource areas). The plan focuses primarily on three resource management issues: (a) resource uses that affect vegetation, soils, and watershed values; (b) the suitability of areas for special management designations; and (c) opportunities for improving resource accessibility. These issues were generated through a process involving input from the public, other agencies, and BLM personnel.

Issues

Resource Uses Affecting Vegetation, Soils, and Watershed Values

There are conflicting demands in the planning area for consumptive and nonconsumptive uses of the vegetative resources. The basic challenge is managing to protect resources such as watershed, water quality, vegetative cover, and wildlife habitat while allowing resource uses that affect vegetation, such as livestock grazing, timber harvest, off-road vehicle use, oil and gas development, and mining.

Special Management Designations

There are areas, values, or resources in the planning area that meet the criteria for protection and management under special management designations, including wilderness. Some areas contain unique resources or values that are in danger of being lost. Some of those areas would be suitable for special management emphasis under designation as areas of critical environmental concern (ACECs).

Resource Accessibility

The value or usability of some resources is enhanced by improved accessibility. To be used, resources must be accessible (in terms of legal and physical access) and manageable (in terms of ability to apply constraints or requirements to benefit other resources). The planning area contains public land resources for which there is a demand for development or use.

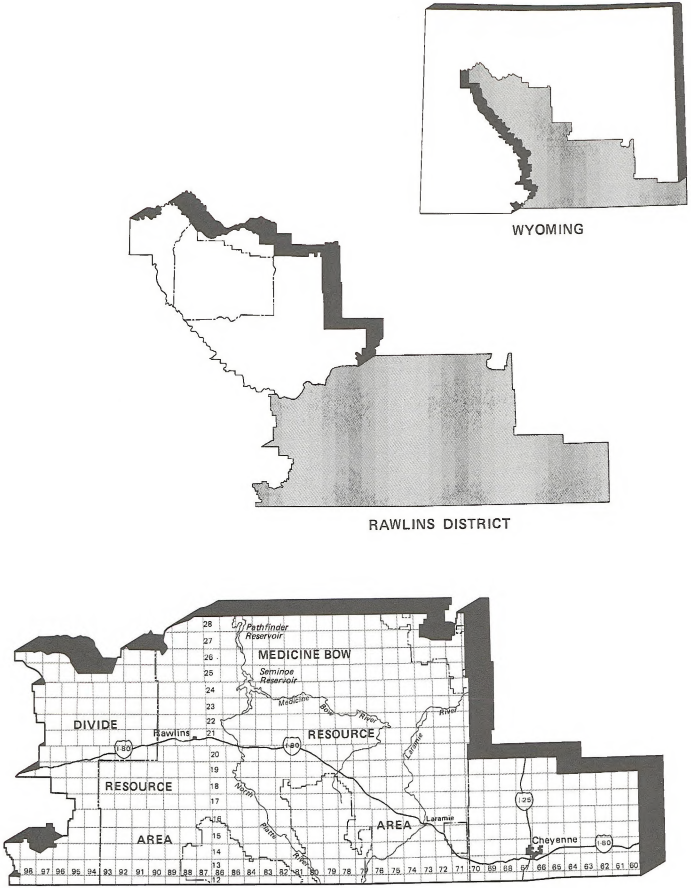
The development or use of oil and gas, other minerals, timber, recreation opportunities, and tracts of public land should be managed in a manner that ensures resource availability while the integrity of resource values is protected. Too much accessibility could lead to development or use that would degrade the value of such resources as visual resources, cultural resources, or wildlife habitat. Therefore, accessibility must be balanced with manageability to maintain or improve usability.

ALTERNATIVES

Introduction

Four alternatives are analyzed in this document that address the issues in different ways. These alternatives are detailed in chapter 2.

The analysis of the environmental consequences of each alternative was based on the anticipated levels of resource use or development. The use of such anticipated levels facilitates analysis of likely environmental effects.



Map 1
GENERAL LOCATION MAP
Medicine Bow-Divide Resource Management Plan

The following sections present a brief description of management actions that are common to all alternatives, followed by a description of each alternative. For a complete understanding of the management actions that would be carried out under a given alternative, these management actions common to all alternatives must be considered along with those described for each alternative.

Management Actions Common to All Alternatives

Listing on the National Register of Historic Places would be sought for all significant sites and segments along the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail. Appropriate actions would be taken to stabilize and protect these sites.

Stipulations would be applied to surface-disturbing activities to protect paleontological resources.

Fire suppression designations would guide future suppression actions. A full suppression designation would be applied to 60% of the planning area, full suppression with management options on 3%, and limited suppression on 36%. The remaining 1% of the planning area would be designated for limited suppression if the BLM could reach an agreement for this designation with owners of adjacent property.

Grazing management decisions that have already been made for part of the planning area will continue unchanged. Those decisions were included in the rangeland program summaries (RPSs) for the Seven Lakes and Divide grazing EIS areas (USDI, BLM 1983d, 1984a). Those documents provided that actions would be taken to maintain or improve forage availability and ecological condition on the basis of monitoring information.

Communication site categories (high-power and low-power categories) would be established for all existing sites, and site plans would be developed.

Access to certain areas of public land would be acquired or maintained to meet resource management objectives as opportunities arose. Such access would support cultural resources, forest management, and recreational activities. The areas where access would be sought vary slightly among the alternatives.

Although the acreage available for consideration for coal leasing varies among the alternatives, five areas encompassing 49,780 acres containing 332.2 million tons of coal would be available for leasing consideration under all alternatives.

New recreation site developments would include a boat launch and picnic area at Prospect Creek and campgrounds at Shirley Mountain, Battle Mountain, and Jelm Mountain. Several areas would be managed as special recreation management areas (SRMAs), including the Continental Divide National Scenic Trail, the North Platte River, and the Shirley Mountains Caves.

The 150-acre Dune Ponds area would be designated open to ORV use under all alternatives. ORV designation in the 8,300-acre Sand Hills area would vary among the different alternatives. In the remainder of the planning area, ORV use would be limited to existing roads and trails under all alternatives.

Management actions would be implemented to mitigate salt and sediment loading caused by surface-disturbing activities in the Muddy Creek, Sage Creek, and Second and Third Sand Creek critical watersheds. Surface-disturbing activities would be prohibited on unstable areas unless it could be demonstrated that the hazard could be overcome.

The planning area would be managed under the following visual resource management classifications: 33,165 acres, Class I; 160,640 acres, Class II; 3,582,195 acres, Class III; and 224,000 acres, Class IV.

Wild horses would be managed to meet the population objectives in existing activity plans for wild horse herd management areas.

Alternative A

Alternative A, the "no action" alternative, would continue present management direction.

No areas would be designated as ACECs.

The present allowable harvest level and current restrictions on timber harvesting would continue under the existing planning decisions. The allowable harvest level would be 12.5 million board feet (MMBF) per decade.

The entire planning area would be made available for utility/transportation systems. Areas to be avoided in plans for new facility placement would be identified case by case. A total of 2,000 acres of land identified in existing land-use plans would be considered for disposal. Existing withdrawals would be continued.

Present grazing levels and management direction would be maintained. No new allotment management plans (AMPs) would be developed under this alternative. Existing AMPs would be maintained. No grazing systems or specific grazing treatments would be proposed. Livestock grazing use would be authorized up to the active preference level of 161,464 animal unit months (AUMs).

A total of 49,780 acres of public land containing 332.2 million tons of coal would be acceptable for further consideration for leasing.

The entire planning area would be open to leasing, exploration, and development of oil and gas. Standard protection requirements would be applied to protect other resource values.

The planning area would be open to locatable minerals entry except for 903,000 acres of existing withdrawals. No new withdrawals would be proposed.

ORV use in the Sand Hills area would be limited to existing roads and trails.

There would be 11 wildlife habitat management areas in which management actions to maintain or enhance wildlife habitat would be implemented. Habitat management practices outside those areas would be based on standard operating procedures. Opportunities to improve riparian habitat for fisheries and wildlife throughout the planning area would be investigated and identified.

Alternative B

Under Alternative B, resource conflicts that occur under existing management would be resolved through restriction of surface-disturbing activities. This alternative generally would be more restrictive than present management; it would restrict activities that are causing conflicts with other resources.

The Baggs elk crucial winter range (79,000 acres), ten raptor concentration areas (79,700 acres), and a white pelican colonial nesting island in Pathfinder Reservoir (12 acres) would be designated ACECs.

Timber harvesting would be permitted only on Shirley Mountain and Elk Mountain. The allowable harvest level would be 6 MMBF per decade.

The entire planning area would be made available for utility/transportation systems. Areas to be avoided in plans for new facility placement would be identified case by case. Disposals would be allowed only for recreation and public purposes (R&PP) or for exchanges. Protective withdrawals would be increased, and all existing withdrawals would be continued.

Under Alternative B, new AMPs for "I" (improve resource conditions) category allotments would be developed so that wildlife, watershed, and riparian values would be enhanced while livestock conflicts with other resources would be reduced. Grazing treatments would be implemented for all "M" (maintain existing conditions), "I" (improve), and "C" (custodial management) allotments now being grazed prior to range readiness. These grazing treatments would eliminate grazing during the critical spring growth period. It is projected that authorized livestock grazing use under this alternative would be 145,109 AUMs in the long term.

A total of 53,620 acres of public land containing 357.2 million tons of coal would be acceptable for further consideration for leasing under Alternative B.

A total of 37,560 acres would be closed to oil and gas leasing to protect resource values in the Sand Hills area, Como Bluff, and raptor concentration areas. The remainder of the planning area would be open to leasing, exploration, and development of oil and gas, with application of standard protection requirements to protect other resource values.

The planning area would be open to locatable minerals entry except for 903,000 acres of existing withdrawals and 16,355 acres of new withdrawals.

ORV use in the Sand Hills area would be limited to designated roads and trails.

There would be 12 wildlife habitat management areas in which management actions to maintain or enhance wildlife habitat would be implemented. Habitat management practices outside those areas would be based on standard operating procedures. Grazing management actions implemented under AMPs for "I" category allotments would incorporate actions to improve riparian habitat.

Alternative C

Under Alternative C, resource conflicts that occur under existing management would be resolved through intensive management of all resources. Attempts would be made either to mitigate impacts caused by surface-disturbing activities or to enhance a resource while maintaining other resource values.

The Como Bluff area (1,760 acres), thirteen raptor concentration areas (100,000 acres), two rare plant areas (230 acres), and the Sand Hills area (8,300 acres) would be designated ACECs.

A total of 960 acres within proposed and existing national natural landmarks (NNLs) would be considered for disposal to individuals, organizations, agencies, or institutions that would manage these areas in accordance with their NNL status. These areas are scattered public land tracts with no legal access.

The forest's growth and diversity would be enhanced by harvesting at a recently recalculated allowable harvest level that incorporates current policy on harvesting restrictions. The allowable harvest level would be 20 MMBF per decade.

The entire planning area would be made available for utility/transportation systems. Areas to be avoided in plans for new facility placement would be identified case by case. A total of 152,000 acres of isolated unmanageable lands or lands needed for community expansion would be considered for disposal. Protective withdrawals would be minimized, and unneeded withdrawals would be revoked.

New AMPs would be developed for "I" category allotments. These AMPs would enhance livestock grazing by increasing the number of AUMs available for livestock grazing use while maintaining other resource values. It is projected that authorized livestock grazing use under this alternative would be 190,969 AUMs in the long term.

A total of 64,595 acres of public land containing 519.1 million tons of coal would be acceptable for further consideration for leasing.

Leasing, exploration, and development of oil and gas in KGS areas would be emphasized through placement of minimal restrictions on surface-disturbing activities.

The planning area would be open to locatable minerals entry except that withdrawals would remain in effect on 81,493 acres of the 903,000 acres of existing withdrawals.

ORV use would be limited to designated roads and trails in the Sand Hills area.

There would be 16 wildlife habitat management areas in which management actions to maintain or enhance wildlife habitat would be implemented. Habitat management practices outside those areas would be based on standard operating procedures. Grazing management actions implemented under AMPs for "I" category allotments would incorporate actions to improve riparian habitat.

Alternative D

Under Alternative D, intensive resource management would be balanced with the use of restrictions to achieve optimal resource management.

The Como Bluff area (1,760 acres), two raptor concentration areas (27,500 acres), and the Sand Hills area (8,300 acres) would be designated ACECs.

A total of 960 acres within proposed and existing NNLs would be considered for disposal to individuals, organizations, agencies, or institutions that would manage these areas in accordance with their NNL status. The areas are scattered public land tracts with no legal access.

The forest's growth and diversity would be enhanced by harvesting at a recently recalculated allowable harvest level that incorporates current policy on harvesting restrictions. The allowable harvest level would be 20 MMBF per decade.

All public lands would be open to utility/transportation systems, but such systems would be located next to existing facilities whenever possible. Systems would be routed around specified avoidance areas if possible.

A total of 66,000 acres of land would be considered for disposal. Protective withdrawals would be minimized, and unneeded withdrawals would be revoked.

Alternative D would provide for a balance between economic use, management to enhance watershed and riparian areas, and enhancement of livestock grazing to achieve optimal resource management. New AMPs would be developed for "I" category allotments. These AMPs would benefit livestock grazing by increasing the number of AUMs available for livestock use while enhancing other resource values. It is projected that authorized livestock grazing use under this alternative would be 186,940 AUMs in the long term.

A total of 64,595 acres of public land containing 519.1 million tons of coal would be acceptable for further consideration for leasing.

The planning area would be open to leasing, exploration, and development of oil and gas with application of standard protection requirements to protect other resource values.

The planning area would be open to locatable minerals entry except for 83,063 acres of withdrawals. This includes 81,493 acres of existing withdrawals, 970 acres of proposed new withdrawals, and 600 acres of C&MU Act withdrawals (see Glossary) that would be continued under FLPMA.

ORV use would be limited to existing roads and trails in the Sand Hills area. Rehabilitation would be emphasized in specific areas.

There would be 16 wildlife habitat management areas in which management actions to maintain or enhance wildlife habitat would be implemented. Habitat management practices outside those areas would be based on standard operating procedures. Grazing management actions implemented under AMPs for "I" category allotments would incorporate actions to improve riparian habitat.

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Chapter One

Purpose and Need; Issues and Criteria

CHAPTER 1

PURPOSE AND NEED; ISSUES AND CRITERIA

INTRODUCTION

This *Resource Management Plan/Environmental Impact Statement for the Medicine Bow and Divide Resource Areas* describes four alternative resource management plans (RMPs) that prescribe different ways of allocating resources and land uses. Each alternative identifies management actions that would be taken on approximately 4 million acres of land in which surface and minerals are federally owned and 1 million additional acres of federal mineral estate only ("split estate"). In addition, this document, as a draft environmental impact statement (EIS), identifies environmental consequences of these alternatives. The complete document is referred to as the Medicine Bow-Divide RMP/EIS.

The planning system of the Bureau of Land Management (BLM) is divided into three distinct tiers (see figure 1). The *policy tier* identifies goals, objectives, priorities, and other factors for use in managing the public land resource. Policy is established in public laws, regulations, executive orders, court orders, guidance from BLM state directors, and approved documents issued by the President, the Secretary of the Interior, or the BLM Director.

The *resource management plan tier* establishes in a plan the combinations of land uses and resource uses, related levels of investment and production or protection to be maintained, and general management practices and constraints for the various public land resources covered by the plan. This RMP/EIS is a part of the resource management plan tier.

The *activity plan tier* provides for the development of plans more detailed, more site-specific, and more limited in scope than the resource management plan tier. The activity plan tier is initiated as necessary after an RMP is selected. An activity plan shows in detail how particular actions are to be carried out site-specifically to accomplish the objectives of the RMP. Activity plans are such documents as allotment management plans (AMPs), habitat management plans (HMPs), and use authorizations.

In this RMP/EIS, when the consequences of implementing the alternatives are addressed, the "short term" refers to five years or fewer; the "long term" is six years or more.

A supplement to this document has been prepared to analyze the consequences of managing three wilderness study areas (WSAs) as wilderness or nonwilderness. The supplement contains an analysis of the suitability of each WSA for designation as wilderness. The proposed action in the supplement will be a part of the preferred alternative in this document.

PURPOSE AND NEED

This document is being prepared to provide a comprehensive framework for managing public lands and resources in the BLM's Medicine Bow and Divide resource areas, Wyoming, and to disclose this management framework to the public. The document prescribes ways of allocating resources and land uses through resource goals, objectives, and general management practices.

The four alternative plans analyzed in this RMP/EIS focus on the resolution of planning issues. As required by section 603 of the Federal Land Policy and Management Act (FLPMA), these alternatives contain proposed actions for three WSAs: Bennett Mountains, Prospect Mountain, and Encampment River Canyon. Through wilderness study reports, the BLM will make preliminary recommendations as to whether a WSA is suitable or nonsuitable for inclusion in the National Wilderness Preservation System (NWPS). These recommendations will be reported to Congress through the Director of the BLM, the Secretary of the Interior, and the President. Final determination to designate or not to designate an area as wilderness can be made only by Congress.

The Adobe Town and Ferris Mountains WSAs also are in the planning area. Alternatives for those WSAs are analyzed in the Adobe Town-Ferris Mountains wilderness EIS (USDI, BLM

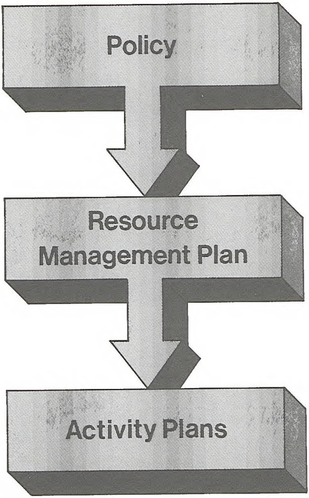


Figure 1
BLM PLANNING SYSTEM TIERS

1984b), and suitability recommendations will be made in a separate wilderness study report.

This RMP/EIS complies with present rangeland policy and responds to a court mandate for preparation of a grazing EIS for the Medicine Bow Resource Area. The purpose of a rangeland management program for public lands is to provide guidelines for managing rangeland resources and related ecosystems, including air, soils, water, vegetation, wildlife and fisheries habitat, wild horses, and livestock. This program is needed to enable the BLM to manage the public land and resources under its jurisdiction properly, to stabilize the livestock industry dependent on public land, and to provide for orderly use, improvement, development, and reclamation of public lands for livestock grazing, consistent with multiple-use management objectives for these lands.

The responsibility and authority are mandated by a series of legal and judicial acts, including the Taylor Grazing Act of 1934 (43 USC 315-315r), the Classification and Multiple Use Act of 1964 (Public Law 88-6071), the National Environmental Policy Act of 1969 (Public Law 91-190), the Federal Land Policy and Management Act of 1976 (Public Law 94-579), the Public Rangelands Improvement Act of 1978 (Public Law 95-514), and the 1974 federal court action on *Natural Resources Defense Council et al. v. Morton et al.*

FORMULATION OF ALTERNATIVES

Both the National Environmental Policy Act (NEPA) and BLM resource management planning regulations require consideration of a range of alternatives. The basic goal in the formulation of alternatives was to identify various combinations of public land uses and resource management practices that responded to the planning issues. The alternatives presented in this chapter represent combinations of actions to guide land-use activities and resource management in the Medicine Bow and Divide resource areas.

Four alternatives are presented in this document. Alternative A is the No Action alternative; that is, under this alternative there would be a continuation of present management direction. For livestock grazing this means that the BLM would continue to allow present livestock use levels, but no new range improvements or other management actions would be implemented at the BLM's initiative except those approved of in existing AMPs.

The three other alternatives provide a range of choices. The preferred alternative (D) is a combination of Alternatives A, B, and C.

Alternative A served as the foundation for formulating the other alternatives. During the development of the management situation analysis (see "The RMP Process" section later in this chapter), all existing management practices for the Medicine Bow and Divide resource areas were compiled to form Alternative A. The effects of Alternative A were then analyzed to identify any resource management conflicts or needs and to determine options for their resolution. The analysis showed that conflicts and needs do indeed exist. Once reasonable management options were identified, they were incorporated into two alternative plans for the planning area, Alternatives B and C.

Alternatives A (no action, continuation of present management), B, and C were then analyzed to identify any significant impacts they might cause and to determine how effective they might be at resolving conflicts and meeting needs. Following this analysis and the consideration of multiple-use tradeoffs, the team developed Alternative D, the preferred alternative, by choosing among the various management options within Alternatives A, B, and C.

DESCRIPTION OF PLANNING AREA

The Medicine Bow and Divide resource areas encompass approximately 12.5 million acres under various ownerships in Albany, Carbon, Laramie, and eastern Sweetwater counties in south central and southeastern Wyoming (see map 1).

The northern boundary of the planning area is formed generally by the northern boundary of Albany, Carbon, and Laramie counties and the east rim of the Great Divide Basin; the western boundary is formed by the BLM Rock Springs District boundary line; the southern boundary is the Colorado-Wyoming state line; and the eastern boundary is the Nebraska-Wyoming state line.

Of the 12.5 million acres in the planning area, approximately 4 million (32%) are public lands managed by BLM. They are concentrated primarily in Sweetwater and Carbon counties. The Forest Service, U. S. Department of Agriculture, (FS) administers about 1 million acres in the Medicine Bow National Forest. The remaining federal land in the planning area is divided among the Bureau of Reclamation, the

U.S. Fish and Wildlife Service (USFWS), and the Department of Defense. Figure 2 shows the distribution of the surface estate in the planning area.

Six million acres of the nonfederal land are privately owned and 800,000 acres are owned by the state of Wyoming. The folded land status map shows landownership. In addition to the 4 million acres of BLM-administered surface over federal minerals, the BLM is responsible for management of 1 million acres of federal minerals under national forest lands and under about 15% of the private surface in the planning area. This RMP/EIS covers management of the federal minerals underlying private lands but not the federal minerals underlying national forests. The FS makes land-use planning decisions for minerals underlying lands administered by that agency.

Grazing EISs have been completed for the Divide Resource Area and for some parts of the Medicine Bow Resource Area. Rangeland decisions for the Divide Basin, Overland, and Seven Lakes planning units were analyzed in the Divide grazing EIS (USDI, BLM 1983a, 1983b) and the Seven Lakes grazing EIS (USDI, BLM 1978a, n.d.). Those decisions are incorporated into this document by reference. The livestock grazing actions for the Medicine Bow portion of the planning area are included in the text of this document. The boundaries of the Medicine Bow grazing EIS area are shown on map 2.

The human population of the planning area is estimated to be between 100,000 and 120,000. Most persons live in the towns and cities of Baggs, Cheyenne, Encampment, Hanna, Laramie, Medicine Bow, Rawlins, Saratoga, and Wamsutter; the rest live in the rural areas outside these communities. The primary industries include mineral exploration and development, ranching, and recreation.

THE RMP PROCESS

Public involvement is an integral part of the entire RMP process. The planning steps described in the regulations (43 CFR 1600) and used in preparing this plan are described below and graphically summarized in figure 3.

Step 1: Identification of Issues

Step 1 is the process of identifying resource management problems, conflicts, or opportunities that can be resolved through the planning process. For this RMP, an interdisciplinary team of managers and resource specialists held several scoping meetings for preliminary identification of issues. In addition, the public, other federal agencies, and state and local governments were asked to identify public land management issues through news releases, public meetings, *Federal Register* notices, and a mass mailing. All identified concerns were assessed, and those that can be addressed through the planning process were consolidated into planning issues. These issues are presented later in this chapter.

Step 2: Development of Planning Criteria

Step 2 involves development of criteria to identify the standards, guidelines, and constraints that would apply to each issue throughout the planning process. For the Medicine Bow-Divide RMP, the planning criteria were developed from policy and program guidance. Notices were published in the *Federal Register* and the news media stating that the criteria were available and encouraging the public to review them. Criteria were revised as the planning issues were refined.

Step 3: Collection of Inventory Data

Step 3 allows for the collection of various kinds of issue-related data on environmental, social, and economic matters. During this step in the Medicine Bow and Divide planning area, soil surveys were completed, and some additional information was collected on range condition, wildlife habitat, coal, and other resources.

Step 4: Analysis of the Management Situation

In Step 4, the current situation is analyzed, public demand is assessed, and the capability of the resources to respond to the issues is evaluated. This analysis, an intermediate stage in the planning process, is the basis for formulating the alternatives for the draft resource management plan. For this planning area, members of an interdisciplinary team prepared an analysis of the management situation for each resource program. These analyses are available for review at the Rawlins District office.

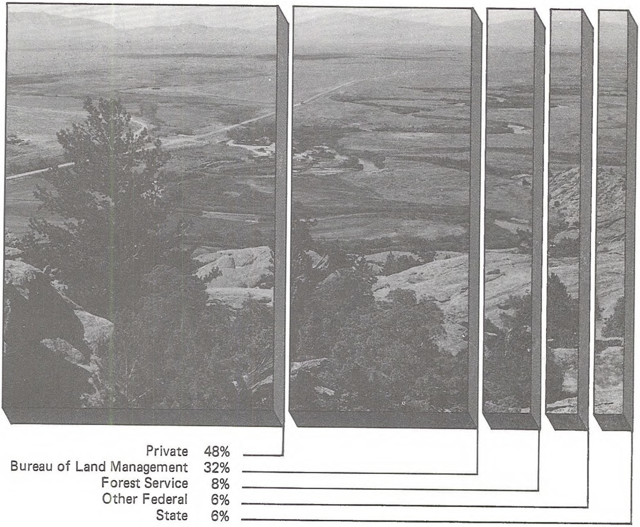
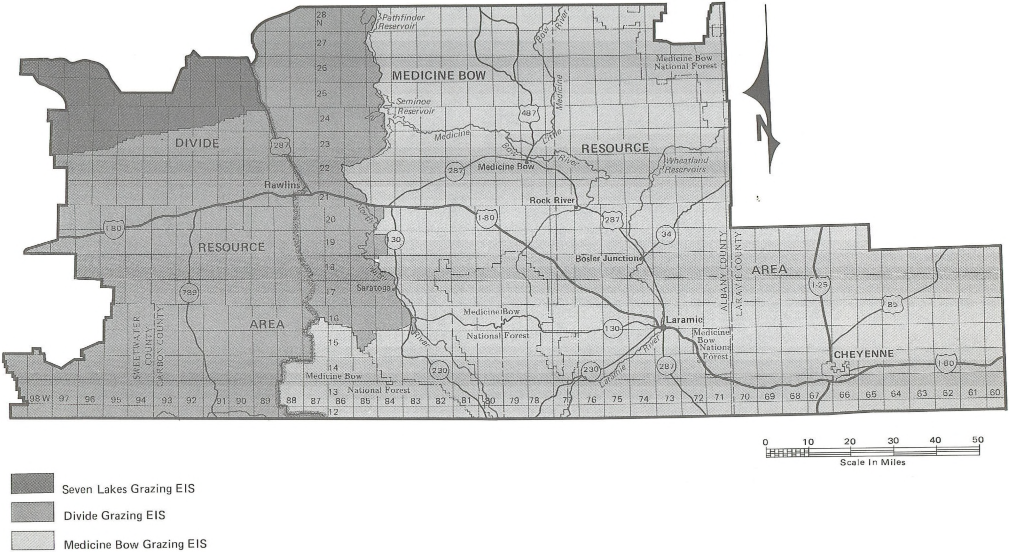


Figure 2
DISTRIBUTION OF SURFACE ESTATE
IN THE PLANNING AREA



Map 2

MEDICINE BOW GRAZING EIS AREA

Medicine Bow/Divide Resource Management Plan

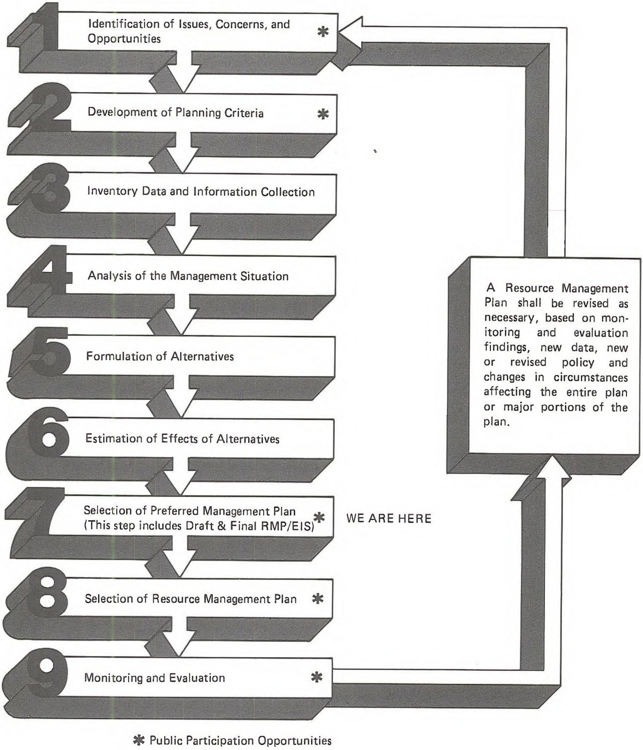

1 Identification of Issues, Concerns, and Opportunities *
2 Development of Planning Criteria *
3 Inventory Data and Information Collection
4 Analysis of the Management Situation
5 Formulation of Alternatives
6 Estimation of Effects of Alternatives
7 Selection of Preferred Management Plan (This step includes Draft & Final RMP/EIS) *
WE ARE HERE
8 Selection of Resource Management Plan *
9 Monitoring and Evaluation *
A Resource Management Plan shall be revised as necessary, based on monitoring and evaluation findings, new data, new or revised policy and changes in circumstances affecting the entire plan or major portions of the plan.
* Public Participation Opportunities

Figure 3
STEPS IN THE PLANNING PROCESS

Step 5: Formulation of Alternatives

Options identified in Step 4 provide the basis for the alternatives formulated in Step 5. For the Medicine Bow-Divide RMP, a range of alternatives was studied to address each program. Alternatives A, B, C, and D are all multiple-use oriented. During alternative formulation, each alternative was approached as a separate and complete multiple-use plan. Therefore, each alternative offers resource production and protection of resources. Each alternative is an implementable resource management plan. There is no one alternative that is totally oriented toward resource use and development, nor is there one alternative that is totally oriented toward nondevelopment or resource protection. The data used for developing these alternatives are available at the office of the Medicine Bow and Divide resource areas.

Step 6: Analysis of Effects of Alternatives

In Step 6, the physical, biological, social, and economic effects of implementing each alternative are assessed. This step is the environmental impact analysis required by NEPA. This analysis for the Medicine Bow and Divide resource areas is documented in chapter 4 of this document.

Step 7: Selection of the Preferred RMP

Step 7 involves selection of the preferred resource management plan and publication of a draft RMP/EIS. The draft RMP/EIS is made available for public review and comment for 90 days. The comment period for this document will begin when the Environmental Protection Agency's notice of filing of the draft RMP/EIS is published in the *Federal Register*.

Selection of the preferred resource management plan (Step 7) for the Medicine Bow-Divide RMP/EIS was based on public input and coordination, current BLM management policies and directions, and analysis of the impacts of each alternative.

Step 8: Selection of the Resource Management Plan

In Step 8, public comments on the draft RMP/EIS are incorporated into the final RMP, and the proposed resource management plan is selected. After publication of a final RMP/EIS, persons who participated in the planning process and could be adversely affected by the plan are allowed 30 days to protest the plan. The state director may approve the plan no earlier than 30 days after the final RMP/EIS is published.

Step 9: Monitoring and Evaluation

Step 9 involves monitoring the selected plan after it is implemented and evaluating the results. The monitoring plan for the Medicine Bow and Divide RMP/EIS will establish appropriate intervals and standards for monitoring and evaluation of the RMP/EIS from the time it is implemented until changing conditions require a revision of the plan or any portion of it. The intervals established for monitoring will not exceed five years.

PLANNING ISSUES AND CRITERIA

Introduction

The BLM planning regulations focus land-use planning on the resolution of issues that arise over the use and management of public lands and resources. A planning issue can be defined as an unrealized opportunity, an unresolved conflict or problem, or a value being lost. Not all issues are related to resource management; therefore, not all issues are planning issues that can be resolved through a resource management plan. Some must be resolved administratively.

Planning Issues

Introduction

Three planning issues are addressed in this document. These issues, which were developed with the use of input from BLM personnel, the public, and other agencies, are listed below with their related planning questions. The planning questions relate to necessary decisions or resource allocations that must be made in the RMP/EIS.

Issue 1: Resource Uses Affecting Vegetation, Soils, and Watershed Values

Issue 1 addresses the conflicting demands for consumptive and nonconsumptive uses of the vegetative resources in the Medicine Bow and Divide resource areas. The basic challenge is protecting resource values such as watershed, water quality, vegetative cover, and wildlife habitat while allowing resource uses that affect vegetation such as livestock grazing, timber harvest, off-road vehicle use, oil and gas development, and mining. The following questions must be answered in the plan.

How should the forest resource be managed to provide for its long-term health and productivity?

What livestock stocking levels are appropriate, and what adjustments need to be made in order to provide adequate forage for livestock, wildlife, and watershed protection?

What management practices and resource development projects will help achieve management objectives for public lands in "I" category allotments in the Medicine Bow grazing EIS area?

What areas are suitable for livestock grazing? What management practices should apply, and when and where should they be applied?

What management practices or use restrictions are needed to maintain or improve wildlife habitat, especially high priority habitat, and to provide adequate habitat quality to support featured species? At what sites in the planning area will these management practices or restrictions be applied?

What management practices should be applied to provide essential habitat for threatened, endangered, or sensitive wildlife and plant species? In what parts of the planning area should these practices be applied?

What vegetative uses and management practices should be allowed on wetland/riparian and aquatic habitat, and when should they be allowed?

What management practices are needed to reduce accelerated soil erosion?

Where and under what conditions should fire be used as a vegetative management tool? In what parts of the resource areas should full suppression or limited suppression be applied?

What conditions of use should be applied to activities that cause or have the potential to cause adverse effects on surface and subsurface water quality and quantity?

Where should remedial actions be taken to improve water qualitysalinity in the Colorado River Basin and other situations where the quality of surface water or groundwater is unsatisfactory?

Issue 2: Special Management Designations

Issue 2 addresses areas, values, or resources in the Medicine Bow and Divide resource areas that meet the criteria for protection and management under special management designations, including wilderness. There are areas that contain unique resources or values that are in danger of being lost. Some of those areas would be suitable for special management emphasis under designation as areas of critical environmental concern (ACECs). The following questions about these areas need to be answered in the plan.

Which wilderness study areas should be recommended for wilderness designation?

What management practices or restrictions are needed in WSAs that would not be designated for wilderness?

Are there any specific areas that would require special management emphasis and designation?

Issue 3: Resource Accessibility

Issue 3 relates to the idea that the value or usability of some resources is enhanced by improved accessibility. To be used, resources must be accessible (in terms of legal and physical access) and manageable (in terms of ability to apply constraints or requirements to benefit other resources). The planning area contains public land resources for which there is a demand for development or use.

The development or use of oil and gas, other minerals, timber, recreation opportunities, and tracts of public land should be managed in a manner that ensures resource availability while the integrity of resource values is protected. Too much accessibility could lead to development or use that would degrade the value of such resources as visual resources, cultural resources, or wildlife habitat. Therefore, accessibility must be balanced with manageability to maintain or improve usability. The following questions need to be answered in the plan.

Where should utility corridors be designated, and what areas should be avoided by or excluded from utility systems, other rights-of-way, or use authorizations?

Which public land tracts or geographic areas are potentially suitable for disposal through transfer from BLM administration by sales, exchange, state indemnity selection, or recreation and public purposes (R&PP) disposal? Which land areas and mineral estates may be suitable for ownership consolidation, and what priority should be assigned to each of these areas?

To what areas or under what circumstances should physical or legal access, or both, be acquired?

Which areas of federal coal in the planning area are acceptable for further consideration for leasing and development?

What areas should be leased for oil or gas development? Where should "no surface occupancy" or other conditions of use be applied to oil and gas leases?

Where should recreation use, including ORV use, be prohibited or authorized, and under what conditions should it be allowed?

Concerns Raised But Not Addressed

In addition to the issues described, a number of concerns were raised that are not addressed as issues in this document because they are beyond the scope of this planning effort, because they can be addressed more appropriately through activity planning, or because they are not within the scope of BLM management responsibilities. These concerns are listed below.

Livestock Grazing Fees. Livestock Grazing fees are set by Congress; therefore, they are not a function of this planning effort.

Forest Service-BLM Interchange. The proposal for a Forest Service-BLM interchange is before the Congress; therefore, it is beyond the scope of this document. Regardless of which agency is responsible, the lands will be managed according to their respective resource plans.

Water Quality Monitoring Plans. Water quality monitoring plans will be developed through activity planning.

Antelope-Fence Conflicts. The decision to require or not to require a standard antelope fence will be made when an environmental assessment (EA) for range improvements is written. Fencing specifications are delineated in section 1741 of the BLM Manual.

Wildlife Population Targets. Wildlife population targets are set by the Wyoming Game and Fish Department (WGFD). The BLM, along with other interested parties, can make suggestions about population targets.

Planning Criteria

Introduction

Planning criteria are the constraints or ground rules that are developed to guide and direct the development of the resource management plan. Planning criteria are used to guide the collection and use of inventory information, the analysis of the management situation, the formulation of alternatives, the analysis of alternatives, and the selection of the preferred alternative.

Overall Considerations

Standard protection requirements for surface-disturbing activities have been developed by the Wyoming State Office (see the Standard Protection Requirements appendix). These standard requirements will be applied as appropriate to meet resource management objectives. In addition, more specific stipulations may be applied for some programs.

When opportunities exist for using stipulations and reclamation techniques consistently across program lines, they should be utilized.

The BLM coordinates with the Bureau of Reclamation in management of the withdrawals surrounding Pathfinder and Seminoe reservoirs. Review of the Bureau of Reclamation withdrawals is pending. Specific management actions for those lands will be addressed if the withdrawals are revoked in the future.

All alternatives should provide for maintaining existing water quality and quantity while efforts are made to meet other resource management objectives.

Consideration should be given to watershed conditions, wildlife habitat, and riparian vegetation in the following areas: Pennock Mountain and Wick big game units, Sage Creek Basin, Austin Creek (and others in the Shirley Mountains), Cherry Creek, Muddy Creek, the Sand Hills area, Pete Creek, Deweese Creek, and Sand Creek.

ACECs and Other Special Designations

The following areas need to be evaluated for special management:

> The Como Bluff area is unique in that it contains important paleontological resources and significant historic values.
>
> Three rare plant populations are known to exist in the planning area: Gibben's beardtongue in the southwest part of the planning area, persistent sepal yellowcress near Seminoe Reservoir, and a cushion plant community near Muddy Gap.
>
> The Sand Hills area is a unique and fragile dune area with diverse vegetation. It also is a high value crucial winter range for both elk and deer.
>
> The crucial winter range for the Baggs elk herd is of high value for this regionally significant elk herd.
>
> A number of areas support concentrations of nesting raptor pairs during critical times of the year.
>
> An island in Pathfinder Reservoir supports a nesting colony of white pelicans, one of only 20 known nesting colonies in the United States.

Fire Management

Full suppression will be provided for the following areas and values: urban/rural interface, energy/transportation corridors, campgrounds and other high intensity recreation sites, commercial forestland, critical wildlife habitat, important cultural resources, range improvements, structures, and oil and gas fields. These areas must be delineated, priority levels must be assigned, and equipment use restrictions must be identified on the basis of input from resource specialists. (Suppression levels are described in the Fire Management appendix.)

Limited suppression zones should be established in areas where the percentage of federal lands is greater than 50% for the area, or where there are "blocks" of BLM-managed land of 3,000 acres or more not less than ½ mile in width. Smaller "blocks" may be designated for limited suppression if all the owners of adjacent property have entered into a cooperative agreement or other understanding stating their full agreement to the objectives and results of limited suppression.

Prescribed fire should be considered in the following programs:

> *Forestry:* for disposal of product residues, seedbed preparation, hazard reduction, control of disease or insects, thinning, or species manipulation.
>
> *Livestock Grazing:* for vegetation manipulation to convert brush to desired species, rejuvenate desired species, increase forage, prevent or retard encroachment by trees, increase nutrient value and palatability, or maintain or improve ecological condition and trend.
>
> *Wildlife:* for diversity of habitat, to establish a mosaic pattern, for vegetation manipulation such as aspen sprouting or brush conversion, or to set back succession.

Forest Management

Collectively, the alternatives should consider a range of timber harvest levels, each of which should allow for recreation and wildlife uses through combinations of intensive management and restrictions.

Lands Program

Access

Priority consideration for acquisition of access must be given to areas of high use, areas with chronic access problems, large blocks of public land, and extensively developed recreation areas.

Any new access, whether obtained through a cooperative approach or by the BLM separately, should be established in conjunction with the management plan for the area. These plans must, at a minimum, include provisions for road or trail maintenance, monitoring use, and protection of resource values.

Cooperative efforts for access between federal, state, and local governments, private organizations, and individual landowners should be considered first.

All known access needs from other programs will be consolidated under the lands program and ranked by priority in the RMP/EIS.

Landownership Adjustments

Disposal. At a minimum, lands to be considered for disposal must meet one or more of the following criteria.

They are difficult and uneconomical to manage.

They were acquired for a specific purpose and are no longer needed for that purpose.

Their disposal would meet important public objectives such as community expansion or agricultural, industrial, or commercial development.

More specific consideration will be given to any parcel being considered for disposal before any actual disposal action (see the Lands appendix).

Exchange. Any lands in the planning area may be exchanged if the public interest would be served by the action. Exchange of public lands for nonfederal lands (or any interest therein, such as access easements) may be considered if the exchange would eliminate inholdings, create better management areas, or result in greater overall public benefits.

Lands to be obtained through exchange would have at least one of the following characteristics.

Their being under BLM management would facilitate access to public lands and resources.

Their being under BLM management would facilitate implementation of RMP/EIS management actions.

They would maintain or enhance public uses and values.

They would enhance local social and economic values.

They would contribute to a more manageable landownership pattern.

Withdrawals and Classifications

Review of currently existing withdrawals and land classifications requires documentation of the continued need, if any, for the withdrawal or classification, present use of the area, and resource values involved. Public opinion also must be considered in the decision to revoke, modify, or continue the withdrawal or classification.

Areas proposed for withdrawal must contain unique resources that cannot be adequately protected by any means other than a protective withdrawal and that are rare in occurrence, are of national significance, or contain substantial public investments.

Special Criteria for Withdrawals and Classifications

Federal Court Judge Joseph H. Pratt issued a preliminary injunction order on February 10, 1986, in *National Wildlife Federation v. Burford et al.* (civil action 85-2238 D.C.D.C.). The order instructs the BLM to manage public lands in conformity with the express conditions contained in land withdrawal and land classification orders that were in effect from January 1, 1981, to the date of the order.

For the purposes of this document, that requirement of Judge Pratt's order will be satisfied by addressing all withdrawals and classifications, including any that have been terminated, in the description and analysis of Alternative A (the "no action" alternative, in which present management would be continued). The descriptions and analyses of all other alternatives, including the preferred alternative, are to be consistent with the objectives of the respective alternatives; that is, if any withdrawals or classifications would be terminated under a given alternative, the impacts of such terminations must be addressed accordingly in discussion of the alternative.

It should be understood that Judge Pratt's preliminary injunction order does not preclude consideration by the BLM of allocations of the affected public lands and their resources to different uses, nor does it preclude land-use planning decisions that would allocate these lands to different uses. However, it does preclude implementation by the BLM of a decision that would be contrary to withdrawal and classification orders as they existed on and after January 1, 1981, unless or until the pending litigation is resolved. Thus, the BLM can take no action on the lands involved that would be contrary to the withdrawals and classifications until the lawsuit is settled, and then action may be taken only if that action is consistent with the court's decision.

The BLM has appealed the preliminary injunction order. If the appeal is successful, actions that were taken to terminate withdrawal and classification orders between January 1, 1981, and February 20, 1986, will have been effective. Such prior termination actions in the planning area that are affected by the preliminary injunction order are noted where appropriate in this document.

Livestock Grazing Management

Allotment Categorization

Livestock grazing allotments have been grouped into three management categories indicating the appropriate level of management for each allotment, according to the allotment's resource needs and potential for improvement. The categories are "I," improve the current unsatisfactory condition; "M," maintain the current satisfactory condition; and "C," manage in a custodial fashion.

The following criteria were used to categorize the allotments in the Medicine Bow grazing EIS area: (a) vegetation condition, trend, and potential for improvement; (b) resource conflicts; (c) opportunity for improvement through intensive management; (d) potential benefits from rangeland projects; (e) landownership conflicts or size of allotment; and (f) cost-effectiveness of implementing range improvements. The Livestock Grazing appendix contains a discussion of the criteria used to evaluate the allotments in the grazing EIS area.

Other Considerations

If information from the rangeland monitoring program demonstrates a need for adjustments in stocking rates, the rates may be altered according to the procedures in the grazing regulations (43 CFR 4100).

In the development of alternatives for the livestock grazing program, the maintenance of the basic soil and vegetation resources will have a high priority, and the economic health and stability of the livestock industry will be considered.

A range of alternatives for livestock use should be considered, including elimination of livestock grazing.

Minerals Management

Consideration will be given to the oil and gas potential in the resource area, and protective measures will be identified for areas with significant resource values such as important wildlife and fish habitat, sensitive watershed areas, important recreational opportunities, and high value visual resources.

All alternatives should assume a continuation of oil and gas leasing; however, the locations where leasing would take place and the kinds of stipulations required may vary among the alternatives.

The unsuitability criteria of the federal coal management program should be applied, or the application of these criteria reviewed, in all areas that contain coal with development potential. Review is needed in areas where the criteria have been applied because of changes in the criteria or because of new inventory data. The coal screening process is described in the Coal appendix.

Recreation Management

Overall Management

The RMP will identify special areas where management of recreation is needed, and management priorities will be assigned to them. Specific objectives for the protection of visitors and resources need to be provided for these areas through activity plans. Activity planning should be initiated only in areas where there are important issues relating to recreation use that can be resolved given the existing limitations on funding and personnel.

Before intensive management or project development is carried out in any new recreation areas, existing recreation management areas must be provided for. For the existing areas, the order of attention should be as follows: (a) congressionally designated areas, (b) major rivers and other water-based areas where the BLM has clear jurisdiction, (c) areas that have outstanding resource values not provided by other agencies or the private sector, and (d) areas where the recreational capacity is regularly exceeded, threatening significant resource values.

The following high-value recreation sites will be identified for recreation management in all alternatives: Bennett Peak, Corral Creek, Pryor Flat, Teton Reservoir, Encampment River trailhead, the Lower Dugway sites, the North Platte River (including Prospect Creek and Big Creek), Nine Mile Hill, and the Continental Divide National Scenic Trail.

Areas that will be considered for additional emphasis on recreation management are the Shirley Mountains Caves, Battle Mountain, and Jelm Mountain.

Off-Road Vehicle Management

All public lands must be designated as open, limited, or closed to off-road vehicle (ORV) use to meet public demand or needs, to protect resources and the safety of public land users, and to minimize conflicts among the various public land users.

The ORV designations are defined as follows:

Open: Vehicle travel is permitted in the area (both on and off roads) if the vehicle is operated responsibly in a manner that will not cause significant undue damage to the soil, wildlife, vegetation, cultural resources, or other important resources on the public lands.

Limited: Vehicle travel is restricted in some manner in the area. Restrictions could take many forms, but the most common are "limited to *existing* roads and trails," which allows vehicle travel only on roads that were in existence at the time of designation or as authorized for future uses; "limited to *designated* roads and trails," which allows vehicle travel only on roads that the BLM designates by signs; and "seasonal restrictions," which restricts vehicle travel in an area or on certain roads during some portion of the year (such as wintertime vehicle restrictions to protect big game on crucial winter range).

Under limitations to existing or designated roads and trails, vehicle travel off roads is permitted only to accomplish necessary tasks and only if such travel would not result in resource damage. Necessary tasks are defined as work requiring the use of a motor vehicle. Examples include picking up big game kills, repairing range improvements, managing livestock, and mineral activities where surface disturbance does not total more than 5 acres, as described in the provisions of 43 CFR 3809.1-3.

Closed: Vehicle travel is prohibited yearlong with no exceptions other than for emergency vehicles in emergency situations. Access by means other than motorized vehicles is permitted.

It is BLM policy in Wyoming that an ORV designation of "limited to existing roads and trails" will be established unless there is a compelling reason to designate an area as open or closed.

The Sand Hills and Dune Ponds areas are of special concern regarding ORV use.

Soils, Water, and Air Management

Consideration will be given to the location and management of areas that are major point and nonpoint sources of water pollution. Point sources include water discharges from oil and gas wells, seismograph holes, and saline springs. Nonpoint sources include areas yielding high sediment and salt. Special consideration should be given to watersheds that are in the Colorado River Basin.

Emphasis will be placed on the management of watersheds that supply water for domestic or community water purposes.

Maintenance of Class I streams will have first priority. This includes improvement of Class II, III, and IV streams that may be degrading Class I streams by adding salt and/or sediment to Class I streams. (Stream classes are explained in the Soils, Water, and Air appendix.)

Areas with large blocks of public land will have priority over areas with limited amounts of public land.

Special study areas (such as the Stratton hydrology study, which the Forest Service is conducting on public land near Saratoga) will continue to receive special management consideration.

Emphasis will be placed on the acquisition of water rights in accordance with state law for management of public lands.

Riparian/wetland areas should be monitored to ensure that they are not being degraded.

The Soils, Water, and Air appendix contains a discussion of the laws providing guidance for that program.

Wilderness

The wilderness supplement to this document (USDI, BLM forthcoming), which will be published in early 1987, will contain detailed recommendations as to the suitability or nonsuitability of three WSAs for designation as wilderness.

Wilderness recommendations are based on two criteria and six quality standards. The criteria address the area's wilderness values (size, naturalness, opportunities for solitude or primitive recreation, multiple-resource benefits, contribution to diversity of the NWPS, and special features) as well as the manageability of the area as wilderness. The six standards, which are also used to determine an area's suitability or nonsuitability for wilderness, are (a) energy and mineral resource values (identified or potential), (b) impacts on other resources or uses, (c) impacts on wilderness values from nondesignation, (d) comments from the public in conjunction with the BLM's analysis of the area, (e) local social and economic effects, and (f) consistency of recommendation with the resource-related plans of other agencies.

Wildlife and Fisheries Management

Overall Criteria

All alternatives should contain provisions for maintenance of existing water quality and quantity as well as provisions to meet other resource management objectives.

Management actions in floodplains and wetlands will include measures to preserve, protect, and, if necessary, restore the natural functions of such areas (as required by Executive Orders 11988 and 11990 and section 6740 of the BLM Manual). Management techniques will be used to minimize the degradation of stream banks and the loss of riparian vegetation. The design and installation of bridges and culverts will be such that adequate fish passage will be maintained.

All alternatives should contain provisions for habitat components in sufficient amounts to support mutually agreed-upon population goals established for all wildlife species in the WGFD strategic plan.

All alternatives should contain provisions for the wildlife program, in coordination with all other uses of land or water, to develop and maintain

All alternatives should contain provisions for the wildlife program, in coordination with all other uses of land or water, to develop and maintain wildlife and fish habitat at prescribed sustained levels to achieve the following aims: (a) to prevent significant damage to rangeland and forest wildlife and fish communities, (b) to prevent and abate pollution, and (c) to direct cultural (vegetative) or management practices toward improvement of fish and wildlife habitat.

Threatened or Endangered Species

No activities will be permitted in habitat for a threatened or endangered species that would jeopardize the continued existence of the species or its habitat. Whenever possible, management actions in habitats for threatened or endangered species will be designed to benefit those species through improvement of habitat and implementation of recovery plans. The USFWS will be consulted before projects are implemented that might affect habitat of threatened or endangered species.

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Chapter Two

Alternatives, Including the Preferred Alternative

CHAPTER 2

ALTERNATIVES, INCLUDING THE PREFERRED ALTERNATIVE

INTRODUCTION

This chapter presents four reasonable and achievable resource management alternatives. Alternative A, the No Action alternative, would continue the present management in the Medicine Bow and Divide resource areas, which has been guided by management framework plans (MFPs) and other approved land use and activity plans. Alternative B would allow resource use but with more emphasis on the protection and enhancement of environmental quality. It would restrict activities that conflict with other resources. Alternative C would provide for mitigating impacts and enhancing resource values while surface-disturbing activities would be allowed. Alternative D, the preferred alternative, is a combination of Alternatives A, B, and C.

Alternatives for the resolution of the planning issues were formulated through analysis by an interdisciplinary team. Varying degrees of emphasis were placed on resource protection and resource production in the alternatives formulated.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Several possible alternatives were considered during the planning process but eliminated from further detailed study. The rationale for dropping each of those possible alternatives is included in the description of each, below.

Elimination of Timber Harvesting

An alternative was considered in which timber would not have been harvested, but it was not analyzed in detail for the following reasons.

The BLM has established policy to manage the forestlands under its administration. This includes harvesting timber when it is economically feasible and environmentally acceptable to do so.

This alternative would not have contained provisions for the increasing mountain pine beetle activity and resultant tree mortality. Timber harvesting programs would reduce future mortality and would recover wood products that would otherwise be lost.

This alternative would not have allowed recognition of the private sector's need for wood. In the planning area, the BLM satisfies only a small portion of this demand; however, much of the BLM-managed timber is at lower elevations, which provides for logging activity when people who work in the timber industry might otherwise be unemployed.

Public comments received during issue identification and criteria development indicated general acceptance of timber harvesting, provided it is properly managed.

Elimination of Livestock Grazing

The elimination of livestock grazing from all public lands in the planning area was considered as one management action for resolving the range management issues. However, after reviewing vegetative data, categorizing allotments, consulting livestock operators, and conducting public meetings, the BLM concluded that eliminating livestock grazing from all public lands was not a viable or necessary option.

Resource conditions, including rangeland vegetation, watershed, and wildlife habitat, would not have benefited significantly from an areawide prohibition of livestock grazing. Furthermore, public comments received during issue identification and criteria development indicated general acceptance of livestock grazing on public land, provided such grazing is properly managed.

Withdrawal from Mineral Activity

One possible alternative considered was withdrawal of the entire planning area from operation under the public land laws, including the 1872 General Mining Law and the mineral leasing laws. This proposal was dropped from further study because of the effect it would have had on the minerals industries, especially oil and gas, coal, uranium, limestone, bentonite, and precious metals. This alternative also would have been directly contrary to the BLM's multiple-use directives in FLPMA, as amended.

Public comments received during issue identification and criteria development indicated general acceptance of mineral development, provided it is properly managed.

Protective Actions for Rare Plants

A rare plant community and two plant species that have been proposed for threatened or endangered status were identified by the public as warranting special management. Designation as ACECs was suggested for sites containing populations of persistent sepal yellowcress and Gibben's beardtongue and for the unique Muddy Gap-Whiskey Gap endemic cushion plant community. (Scientific names are listed in table 19 in chapter 3.)

Designation of the Gibben's beardtongue site and the cushion plant community as ACECs is considered in the alternatives analyzed; however, designation of sites of persistent sepal yellowcress has not been considered. The extent of this plant's occurrence is not well known, and opportunities for special management are limited.

Persistent sepal yellowcress is found on the shores of Seminoe Reservoir. Concern was expressed that the population might be affected by coal development; however, this concern has not been addressed in the alternatives analyzed in detail because coal mining would not occur close enough to the water's edge to affect the population.

Concern also was expressed that the Bureau of Reclamation proposal to raise the level of Seminoe Reservoir could affect populations of persistent sepal yellowcress. However, since that proposal is not within the scope of this document, it has not been addressed in the alternatives analyzed in detail. If the Bureau of Reclamation should pursue the proposal, the effects on the rare plant species would be addressed at that time.

Acquisition of Cultural Resource Properties

Acquisition of certain properties containing cultural values was considered as an option to enhance management of cultural resources in the planning area. However, the planning area already contains more than 5,000 known cultural properties, and there is a potential for additional discoveries. Therefore, acquisition of additional properties would not have been an effective function of the BLM's cultural resource management program. Instead, the program will focus on more effective management of cultural resource properties now known to be on public lands.

ALTERNATIVES CONSIDERED IN DETAIL

The four alternatives considered in the Medicine Bow-Divide RMP/EIS are compared in table 1. Each alternative is described in terms of resource objectives and planned management actions for specific resources, and each incorporates the management actions common to all alternatives.

The environmental consequences of the alternatives are summarized in table 2.

TABLE 1

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
THEME	This alternative would continue present management practices based on existing land-use plans.	This alternative would resolve resource conflicts that occur under existing management by restricting surface-disturbing activities. Generally, this alternative would be more restrictive than present management—would restrict activities that are causing conflicts with other resources.	This alternative would resolve resource conflicts that occur under existing management by intensively managing all resources in an attempt either to mitigate impacts caused by surface-disturbing activities or to enhance a resource while maintaining other resource values.	The objective of this alternative is to achieve optimal resource management by balancing the use of restrictions with intensive management.
AREAS OF CRITICAL ENVIRONMENTAL CONCERN	There are no ACECs in the planning area at present.	The following areas have been identified as potential ACECs. (Locations are shown on the ACEC folded map.)	The following areas have been identified as potential ACECs. (Locations are shown on the ACEC folded map.)	The following areas have been identified as potential ACECs. (Locations are shown on the ACEC folded map.)
	Baggs Elk Crucial Winter Range	**Baggs Elk Crucial Winter Range**	**Baggs Elk Crucial Winter Range**	**Baggs Elk Crucial Winter Range**
	Objective: To manage resources in the Baggs elk crucial winter range area (79,000 acres) to maintain the integrity of elk crucial winter habitat, allow for development of coal and oil and gas, and seek the cooperation of owners of adjacent property to manage the habitat.	Objective: Same as Alternative A	Objective: Same as Alternative A	Objective: Same as Alternative A
	Management Actions: The area would not be designated an ACEC.	Management Actions: The area would be designated an ACEC.	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A
	Damage to the elk crucial winter habitat from surface-disturbing activities would be minimized by application of standard surface protection stipulations.	Damage to elk crucial winter habitat from surface-disturbing activities would be minimized as in Alternative A. In addition, intensive management of surface-disturbing activities would prevent loss of significant elk winter habitat. This would entail case-by-case examination of	Outside KGS areas, same as Alternative B. Losses of high-priority habitat in KGSs and in coal development areas would be mitigated through reclamation and off-site habitat acquisition and/or habitat development.	Same as Alternative B

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
AREAS OF CRITICAL ENVIRONMENTAL CONCERN (continued)		proposals to determine potential adverse effects and appropriate mitigation to minimize those effects. Spatial and temporal management of development, facilities, and uses would avoid certain times of the year and certain areas.		
	Plans of operations or notices of intent would be required for locatable mineral exploration and development (except casual use) consistent with regulations. (A plan of operations would be required for disturbance of more than 5 acres.)	Plans of operations would be required for locatable mineral exploration and development (except casual use) regardless of the number of acres that would be disturbed in the ACEC.	Same as Alternative A	Same as Alternative A
	The BLM would cooperate with owners of adjacent property to manage the habitat.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	The BLM would coordinate with the WGFD and would recommend managing elk population objective levels at a number supportable by the existing habitat.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Como Bluff	**Como Bluff**	**Como Bluff**	**Como Bluff**
	Objective: To manage resources in the Como Bluff area (1,760 acres) to maintain the integrity of the Como Bluff National Register District/National Natural Landmark. This NNL would be managed for its paleontological resources and historical values.	Objective: To manage resources in the Como Bluff area as in Alternative A, plus to manage in a manner that preserves historically significant sites.	Objective: To manage resources in the Como Bluff area as in Alternative B, plus to manage in a manner that allows for mineral development.	Objective: Same as Alternative C
	Management Actions: The area would not be designated an ACEC.	Management Actions: Same as Alternative A	Management Actions: The area would be designated an ACEC.	Management Actions: Same as Alternative C

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
AREAS OF CRITICAL ENVIRONMENTAL CONCERN (continued)	Standard protection requirements would be applied to surface-disturbing activities to minimize disturbance of paleontological resources and historical values.	Same as Alternative A	Standard protection requirements would be applied as in Alternative A, plus surface-disturbing activities within 1/4 mile of the Morrison Formation (a fossil-bearing formation) would be intensively managed. This would entail case-by-case examination of proposals to determine potential adverse effects and appropriate mitigation to minimize those effects.	Same as Alternative C
	Oil and gas leasing would be allowed with standard protection requirements for surface-disturbing activities.	Area would be closed to oil and gas leasing.	Oil and gas leasing would be allowed; protection requirements described above would be applied.	Same as Alternative C
	Plans of operations or notices of intent would be required for locatable mineral exploration and development (except casual use) consistent with regulations. (A plan of operations would be required for disturbance of more than 5 acres.)	The area would be withdrawn from locatable mineral entry.	Plans of operations would be required for locatable mineral exploration and development (except casual use) regardless of the number of acres that would be disturbed in the ACEC.	Same as Alternative C
	Gibben's Beardtongue Site	**Gibben's Beardtongue Site**	**Gibben's Beardtongue Site**	**Gibben's Beardtongue Site**
	Objective: To continue present management of the 10-acre population of Gibben's beardtongue (*Penstemon gibbensii*) in the southwest part of the planning area.	Objective: To manage the 10-acre population of Gibben's beardtongue to maintain or enhance the population.	Objective: Same as Alternative B	Objective: Same as Alternative B
	Management Actions: The area would not be designated an ACEC.	Management Actions: Same as Alternative A	Management Actions: The area would be designated an ACEC.	Management Actions: Same as Alternative A
	The known population of Gibben's beardtongue would be	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
AREAS OF CRITICAL ENVIRONMENTAL CONCERN (continued)	protected from disturbance by maintenance of existing fencing around the population. Established trend studies would be continued.			
	Plans of operations or notices of intent would be required for locatable mineral exploration and development (except casual use) consistent with regulations. (A plan of operations would be required for disturbance of more than 5 acres.)	Same as Alternative A	Plans of operations would be required for locatable mineral exploration and development (except casual use) regardless of the number of acres that would be disturbed in the ACEC.	Same as Alternative A
	Muddy Gap Cushion Plant Community	**Muddy Gap Cushion Plant Community**	**Muddy Gap Cushion Plant Community**	**Muddy Gap Cushion Plant Community**
	Objective: To continue present management of the 220-acre Muddy Gap cushion plant community.	Objective: To manage the 220-acre Muddy Gap cushion plant community to maintain or enhance the population.	Objective: Same as Alternative B	Objective: Same as Alternative B
	The cushion plant community would not be designated an ACEC.	Same as Alternative A	The cushion plant community would be designated an ACEC.	Same as Alternative A
	Plans of operations or notices of intent would be required for locatable mineral exploration and development (except casual use) consistent with regulations. (A plan of operations would be required for disturbance of more than 5 acres.)	The area would be withdrawn from locatable mineral entry.	Plans of operations would be required for locatable mineral exploration and development (except casual use) regardless of the number of acres that would be disturbed in the ACEC.	Same as Alternative A
	The BLM would monitor the plant community.	The BLM would coordinate with The Nature Conservancy to monitor the plant community. If monitoring indicated a need, protective measures would be taken as necessary to protect the community.	Same as Alternative B	Same as Alternative B

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
AREAS OF CRITICAL ENVIRONMENTAL CONCERN (continued)	**White Pelican Island**	**White Pelican Island**	**White Pelican Island**	**White Pelican Island**
	Objective: To manage the 12-acre pelican island to maintain nesting habitat for a colony of white pelicans.	Objective: To manage the 12-acre pelican island to maintain and enhance nesting habitat for a colony of white pelicans.	Objective: Same as Alternative B	Objective: Same as Alternative B
	Management Actions: The island would not be designated an ACEC.	Management Actions: The island would be designated an ACEC.	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A
	The population would be monitored for disturbance and habitat change.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	If monitoring indicated a habitat problem, the BLM would coordinate with the Bureau of Reclamation and the WGFD to initiate actions for control of habitat disturbance.	The BLM would initiate actions to control habitat disturbance through a management agreement with the Bureau of Reclamation and the WGFD.	Same as Alternative B	Same as Alternative A
	Plans of operations or notices of intent would be required for locatable mineral exploration and development (except casual use) consistent with regulations. (A plan of operations would be required for disturbance of more than 5 acres.)	Plans of operations would be required for locatable mineral exploration and development (except casual use) regardless of the number of acres that would be disturbed in the ACEC.	Same as Alternative A	Same as Alternative A
	Raptor Concentration Areas	**Raptor Concentration Areas**	**Raptor Concentration Areas**	**Raptor Concentration Areas**
	Objective: To manage resources in the raptor concentration areas (100,000 acres) to protect nesting raptor pairs during critical periods.	Objective: To manage resources in the raptor concentration areas (100,000 acres) to maintain the productivity of nesting raptor pairs, allow for development of coal and oil and gas, and seek the cooperation of owners of adjacent property to manage raptor nesting habitat.	Objective: Same as Alternative B	Objective: Same as Alternative B

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
AREAS OF CRITICAL ENVIRONMENTAL CONCERN (continued)	Management Actions: No raptor concentration areas would be designated ACECs.	Management Actions: The following areas (79,700 acres) would be designated ACECs: Blue Gap, Bolton Rim, Brown Canyon Rim, Cherokee, Doty Mountain, Muddy Creek, Platte Divide, Red Rim (rim area), Seminoe, and Shamrock Hills.	Management Actions: The following areas (100,000 acres) would be designated ACECs: Atlantic Rim, Blue Gap, Bolton Rim, Brown Canyon Rim, Cherokee, Delaney Rim, Doty Mountain, Hanna, Muddy Creek, Platte Divide, Red Rim, Seminoe, and Shamrock Hills.	Management Actions: The following areas (27,500 acres) would be designated ACECs: Seminoe and Shamrock Hills.
	Standard protection requirements (seasonal restrictions) would be applied to surface-disturbing activities on 100,000 acres to reduce disturbance of raptors during certain periods.	Standard protection requirements (seasonal restrictions) would be applied to surface-disturbing activities on 20,300 acres to reduce disturbance of raptors during certain periods in the following areas: Atlantic Rim, Delaney Rim, Hanna, and Red Rim (nonrim area).	Standard protection requirements that would be applied are described below.	Same as Alternative B
	Standard protection requirements that would be applied are described above.	Standard protection requirements (surface disturbance restrictions) would be applied to surface-disturbing activities on 79,700 acres to reduce disturbance of raptor habitat in the following areas: Blue Gap, Bolton Rim, Brown Canyon Rim, Cherokee, Doty Mountain, Muddy Creek, Platte Divide, Red Rim (rim area), Seminoe, and Shamrock Hills.	Standard protection requirements (surface disturbance restrictions) would be applied to surface-disturbing activities on 100,000 acres to reduce disturbance of raptor habitat. This includes areas listed for Alternative B, plus the following areas: Atlantic Rim, Delaney Rim, Hanna, and the nonrim area of Red Rim.	Same as Alternative B
	See above action.	Surface-disturbing activities would be intensively managed to maintain raptor nesting habitat on the 79,700 acres. This would entail case-by-case examination of proposals to determine potential adverse effects and appropriate mitigation to minimize those effects.	Same as Alternative B, except the action would be taken on the 100,000 acres identified above.	Same as Alternative B, except the action would be taken only on the 27,500 acres in the Shamrock Hills and Seminoe areas.

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
AREAS OF CRITICAL ENVIRONMENTAL CONCERN (continued)		Developments, uses, and facilities would be managed temporally and spatially to avoid certain times of the year and certain areas.		
	Oil and gas leasing would be allowed with application of standard protection requirements (seasonal restrictions).	The Seminoe and Shamrock Hills areas (27,500 acres) would be closed to oil and gas leasing. In the remaining areas (72,500 acres), oil and gas leasing would be allowed with application of surface protection measures.	Oil and gas leasing would be allowed with application of surface protection measures.	Oil and gas leasing would be allowed with application of surface protection measures.
	Since no areas would be designated ACECs, management relating to locatable minerals is described below.	For areas that would be designated ACECs, plans of operations would be required for locatable mineral exploration and development (except casual use) regardless of the number of acres that would be disturbed in the ACEC.	For areas that would be designated ACECs, plans of operations would be required for locatable mineral exploration and development (except casual use) regardless of the number of acres that would be disturbed in the ACEC.	For areas that would be designated ACECs, management relating to locatable minerals would be the same as Alternative C.
	For areas not designated ACECs, plans of operations or notices of intent would be required for locatable mineral exploration and development (except casual use) consistent with regulations. (A plan of operations would be required for disturbance of more than 5 acres.)	For areas not designated ACECs, management relating to locatable minerals would be the same as Alternative A.	Since all areas would be designated ACECs, management relating to locatable minerals is described above.	For areas not designated ACECs, management relating to locatable minerals would be the same as Alternative A.
	The BLM would seek the cooperation of owners of adjacent property to manage raptor nesting habitat.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Sand Hills	**Sand Hills**	**Sand Hills**	**Sand Hills**
	Objective: To manage the resources in the Sand Hills area (8,300 acres) to protect	Objective: Same as Alternative A	Objective: Same as Alternative A	Objective: Same as Alternative A

TABLE 1 (Continued)
COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
AREAS OF CRITICAL ENVIRONMENTAL CONCERN (continued)	the unique vegetation complex, to maintain wildlife habitat values, to minimize soil erosion, and to promote recreational opportunities.			
	Management Actions: The area would not be designated an ACEC.	Management Actions: Same as Alternative A	Management Actions: The area would be designated an ACEC.	Management Actions: Same as Alternative C
	Damage to the unique vegetation complex would be minimized by application of standard surface protection stipulations.	Same as Alternative A	Damage to the unique vegetation complex would be minimized by application of standard surface protection stipulations and, in addition, by intensive management of surface-disturbing activities. This would entail case-by-case examination of proposals to determine potential adverse effects and appropriate mitigation to minimize those effects. Developments, uses, and facilities would be managed temporally and spatially to avoid damage to the vegetation.	Same as Alternative C
	Oil and gas leasing would be allowed with standard protection requirements for surface-disturbing activities.	Area would be closed to oil and gas leasing.	Oil and gas leasing would be allowed; protection requirements as described above would be applied.	Same as Alternative C
	Plans of operations or notices of intent would be required for locatable mineral exploration and development (except casual use) consistent with regulations. (A plan of operations would be required for disturbance of more than 5 acres.)	Same as Alternative A	Plans of operations would be required for locatable mineral exploration and development (except casual use) regardless of the number of acres that would be disturbed in the ACEC.	Same as Alternative C
	Motor vehicle use would be limited to existing roads and trails.	Motor vehicle use would be limited to designated roads and trails.	Same as Alternative B	Same as Alternative A, with rehabilitation and mitigation practices carried out in specific problem areas.

TABLE 1 (Continued)
COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
AREAS OF CRITICAL ENVIRONMENTAL CONCERN (continued)	No additional management actions would be planned.	Same as Alternative A	Same as Alternative A	The area would be intensively inventoried to identify the locations of existing roads and trails, areas that mule deer avoid because of human activities, and areas where soil disturbance and wind erosion are concentrated.
	No additional management actions would be planned.	Same as Alternative A	Same as Alternative A	In cooperation with interested parties, the BLM would develop action plans to mitigate effects in identified mule deer avoidance zones and rehabilitate concentrated soil disturbance and wind erosion.
CULTURAL RESOURCES/ NATURAL HISTORY MANAGEMENT	**Cultural Resources**	**Cultural Resources**	**Cultural Resources**	**Cultural Resources**
	Objective: To stabilize and protect significant sites and segments along the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail (see Historic Trail folded map).	Objective: Same as Alternative A	Objective: Same as Alternative A	Objective: Same as Alternative A
	Management Actions: In addition to the actions described under "Leasable Minerals—Oil and Gas" and "Locatable Minerals," the following actions would be taken on segments of these trails and related sites.	Management Actions: In addition to the actions described under "Leasable Minerals—Oil and Gas" and "Locatable Minerals," the following actions would be taken on segments of these trails and related sites.	Management Actions: In addition to the actions described under "Leasable Minerals—Oil and Gas" and "Locatable Minerals," the following actions would be taken on segments of these trails and related sites.	Management Actions: In addition to the actions described under "Leasable Minerals—Oil and Gas" and "Locatable Minerals," the following actions would be taken on segments of these trails and related sites.
	National Register listing would be sought for significant sites. Actions would be taken as appropriate to meet the objective for the significant trail segments.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Opportunities to acquire legal access would be pursued	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
CULTURAL RESOURCES/ NATURAL HISTORY MANAGEMENT (continued)	to ensure continued administrative and public availability of improved and stabilized cultural sites.			
	Natural History	**Natural History**	**Natural History**	**Natural History**
	Objective: To maintain the integrity of existing and proposed national natural landmarks. Proposed actions involving surface disturbance in these areas would be considered case by case.	Objective: Same as Alternative A	Objective: Same as Alternative A	Objective: Same as Alternative A
	Management Actions: In the Gangplank proposed NNL, 160 acres would be considered for disposal. No lands in the Big Hollow and Sand Creek NNLs would be considered for disposal (see NNL folded map).	Management Actions: No lands in the Gangplank proposed NNL or in the Big Hollow and Sand Creek NNLs would be considered for disposal.	Management Actions: Lands totaling 160 acres in the Gangplank proposed NNL, 640 acres in the Big Hollow NNL, and 160 acres in the Sand Creek NNL would be considered for disposal to individuals, organizations, agencies, or institutions that would manage these areas in accordance with their NNL status (see NNL folded map).	Management Actions: Same as Alternative C
	The Como Bluff National Register District/NNL (1,760 acres) would be managed for its paleontological resources and historical values (see ACEC section).	Same as Alternative A	Same as Alternative A, but in addition Como Bluff would be designated an ACEC (see ACEC section).	Same as Alternative C
	Paleontological resources would be protected through the use of standard stipulations for surface-disturbing activities and discretionary management authority. Inventories would be conducted case by case for each proposed surface-disturbing activity.	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
FIRE MANAGEMENT	Objectives: To concentrate fire suppression efforts in areas containing high resource and/or human values and in areas with intermingled landownership patterns.	Objectives: Same as Alternative A	Objectives: Same as Alternative A	Objectives: Same as Alternative A
	To use prescribed fire to help meet the objectives of other programs (such as reduction of fuels or the maintenance and/or improvement of wildlife habitat or range condition).	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Management Actions: Areas in the planning area would be designated for different levels of fire suppression, as listed below and defined in the Fire appendix. Fire management plans would be written that would contain criteria for protecting high resource values such as significant cultural resources, crucial winter range for big game, high priority watersheds, and high-value scenic areas (see Fire Management appendix and map 3).	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A
	Fire suppression designations would be assigned as follows:	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Full Suppression: Approximately 60% of the planning area would be designated as a full suppression area with no equipment restrictions.	Full Suppression: Same as Alternative A	Full Suppression: Same as Alternative A	Full Suppression: Same as Alternative A
	Full Suppression With Management Options: Approximately 3% of the planning area would be designated as a full fire	Full Suppression with Management Options: Same as Alternative A	Full Suppression with Management Options: Same as Alternative A	Full Suppression with Management Options: Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
FIRE MANAGEMENT (continued)	suppression area "with management options"; that is, restrictions may be placed on the use of standard full suppression firefighting techniques.			
	Limited Suppression: Approximately 36% of the planning area would be designated a limited fire suppression area.	Limited Suppression: Same as Alternative A	Limited Suppression: Same as Alternative A	Limited Suppression: Same as Alternative A
	The remaining 1% of the planning area is proposed for a limited suppression classification following consultation and agreement with the landowners in the area. If agreement cannot be reached to allow limited suppression of wildfires, the area would be managed under a full suppression classification.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Prescribed Fire: Prescribed fire would be used to achieve management objectives, especially on AMPs and HMPs. Prescribed burning would be conducted in a manner that would avoid violation of the Wyoming Ambient Air Quality Standards.	Prescribed Fire: Same as Alternative A	Prescribed Fire: Same as Alternative A	Prescribed Fire: Same as Alternative A
FOREST MANAGEMENT	Objective: To continue existing planning decisions, including the present allowable harvest level and the current restrictions on timber harvesting.	Objective: To minimize disturbances caused by harvesting by permitting timber harvesting only on Shirley Mountain and Elk Mountain. The remaining commercial forestland would be excluded from harvesting.	Objective: To enhance the forest's growth and diversity by harvesting at a recently recalculated allowable harvest level, incorporating revised harvesting restrictions.	Objective: Same as Alternative C
	Management Actions: The 111,403 acres of forestland would be managed	Management Actions: The 111,403 acres of forestland would be managed	Management Actions: The 111,403 acres of forestland would be managed	Management Actions: The 111,403 acres of forestland would be managed

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
FOREST MANAGEMENT (continued)	as follows (see Forestry appendix for more detail).	as follows (see Forestry appendix for more detail).	as follows (see Forestry appendix for more detail).	as follows (see Forestry appendix for more detail).
	1. Lands available for intensive management of forest products (17,012 acres) would be managed to achieve a highly productive forest by implementing activities to enhance tree growth and health. Timber sales would be concentrated in these areas.	1. Lands available for intensive management of forest products would be managed the same as under Alternative A, except that the total would be 15,622 acres.	1. Lands available for intensive management of forest products would be managed the same as under Alternative A, except that the total would be 19,159 acres.	1. Same as Alternative C
	2. On lands available for restricted management of forest products (3,404 acres), timber would be harvested but practices such as clearcutting would be restricted. Types of areas that this applies to include steep slopes and riparian areas with the buffer zones surrounding them.	2. Lands available for restricted management of forest products would be managed the same as under Alternative A except that the total would be 624 acres.	2. Lands available for restricted management of forest products would be managed the same as under Alternative A except that the total would be 6,707 acres.	2. Same as Alternative C
	3. On lands where the forests are managed to enhance other uses (85,228 acres), forest management would be tailored specifically to benefit other identified resource values or uses. Aspen and other noncommercial species are included in this category.	3. Same as Alternative A	3. Same as Alternative A	3. Same as Alternative A
	4. Forestlands not available for management of forest products (5,759 acres) are areas where forest management would be excluded.	4. Forestlands not available for management of forest products would total 9,929 acres.	4. Forestlands not available for management of forest products would total 309 acres.	4. Same as Alternative C
	The allowable harvest level would be 12.5 MMBF per	The allowable harvest level would be 6 MMBF per decade.	The allowable harvest level would be 20 MMBF per decade.	Same as Alternative C

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
FOREST MANAGEMENT (continued)	decade. Timber would be harvested on an even flow basis.	Timber would be harvested on an even flow basis.	Timber would be harvested at an accelerated level—approximately 16.5 MMBF in the first 5 years of the first decade—in response to the increased mountain pine beetle activity.	
	Precommercial thinning would be done on about 150 acres within the next 15 years. Thereafter, about 100 acres per year would be thinned.	Precommercial thinning would be done on about 150 acres within the next 15 years. Thereafter, about 60 acres per year would be thinned.	Precommercial thinning would be done on about 150 acres within the next 15 years. Thereafter, about 150-200 acres per year would be thinned.	Same as Alternative C
	About 500 acres of unmerchantable, nonproductive lodgepole pine would be eradicated within the next 20 years (see Forestry appendix for more information on stand eradication).	About 200 acres of unmerchantable, nonproductive lodgepole pine would be eradicated within the next 20 years (see Forestry appendix for more information on stand eradication).	Same as Alternative A	Same as Alternative A
	Minor wood products such as firewood, poles, posts, Christmas trees, and wildlings would be available on demand.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	The BLM would pursue opportunities to acquire or maintain legal access to the areas of public land listed below to support intensive management of commercial forestland: High importance—Elk Mountain, Shirley Mountain, Arlington, Little Medicine; moderate importance—White Rock Canyon, Toltec, North Laramie River, Pine Mountain/Split Rock; low importance—Woodedge, Seven Mile, Sugarloaf.	The BLM would pursue opportunities to acquire or maintain legal access to the areas of public land at Elk Mountain and Shirley Mountain (high importance) to support intensive management of commercial forestland.	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
FOREST MANAGEMENT (continued)	Consolidation of landownership on Elk Mountain would be considered as opportunities arose (moderate priority). Consolidated landownership would increase the efficiency of forest management.	Consolidation of landownership on Elk Mountain and Shirley Mountain would be considered as opportunities arose (moderate priority). Consolidated landownership would increase the efficiency of forest management.	Consolidation of landownership would not be considered.	Same as Alternative B
LANDS PROGRAM	Objective: To continue existing planning decisions by making the entire planning area available for utility/transportation systems, by considering few lands for disposal, and by continuing all existing withdrawals.	Objective: To increase the protection of natural resources and cultural resources and minimize disturbance by restricting utility/transportation systems, by avoiding high value lands when routing utility/transportation systems, by allowing disposals only for R&PP use and exchanges, by increasing protective withdrawals, and by continuing all existing withdrawals.	Objective: To encourage development and emphasize industrial values by allowing utility/transportation systems within the entire planning area under standard restrictions, by considering disposal of isolated, unmanageable lands or lands needed for community expansion, by minimizing protective withdrawals, and by revoking unneeded withdrawals.	Objective: To pursue balanced management by allowing utility/transportation systems in the entire planning area under standard restrictions, by avoiding high value lands when routing utility/transportation systems, by considering disposal of isolated, unmanageable lands or lands needed for community expansion, by placing protective withdrawals only on unique resources or facilities, and by revoking unneeded withdrawals.
	Utility/Transportation Systems	**Utility/Transportation Systems**	**Utility/Transportation Systems**	**Utility/Transportation Systems**
	All public lands would be open to utility/transportation systems, but such systems would be located in existing corridors whenever possible.	Same as Alternative A	Same as Alternative A	All public lands would be open to utility/transportation systems, but such systems would be located next to existing facilities whenever possible.
	Standard protection requirements for surface-disturbing activities would be applied to activities related to utility/transportation systems to protect important resource values such as those listed under "Leasable Minerals—Oil and Gas."	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
LANDS PROGRAM (continued)	(More information is in the Lands appendix.)			
	Areas to be avoided in plans for new facility placement and routes would be identified case by case.	Same as Alternative A	Same as Alternative A	Areas identified on map 4 would be avoided in plans for new facility placement and routes. When facilities must be placed within avoidance areas, effects would be intensively mitigated.
	Communication Sites	**Communication Sites**	**Communication Sites**	**Communication Sites**
	Site categories would be established for all existing communication sites (see map 5). The following criteria form the basis for site categorization:	Same as Alternative A	Same as Alternative A	Same as Alternative A
	High-power communication sites must be reserved for broadcast television and radio transmitters of 100 watts or more.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Low-power communication sites must be reserved for microwave, mobile telephone/radio, and other low-power transmitters of fewer than 100 watts.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	A 2-mile buffer from other transmission facilities would be maintained around each site to ensure its integrity. Communication site plans would be developed for all existing sites, and they must be prepared before any new site is approved or developed.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Landownership Adjustments	**Landownership Adjustments**	**Landownership Adjustments**	**Landownership Adjustments**
	Exchanges and R&PP disposals would be considered case by case when such actions would	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
LANDS PROGRAM (continued)	be consistent with the objectives of this RMP.			
	A total of 2,000 acres of land identified in existing land-use plans would be considered for disposal (see map 6).	No specific tracts would be identified to be considered for disposal.	A total of 152,000 acres of land would be considered for disposal. Specific tracts and FLPMA criteria are identified on map 7.	A total of 66,000 acres of land would be considered for disposal. Specific tracts and FLPMA criteria are identified on maps 8, 9, 10, and 11
	Access The need for access is discussed under "Cultural Resources," "Forest Management," and "Recreation." The BLM would pursue opportunities to acquire or maintain legal access to the following areas, listed by level of importance: High—Arlington (forestry), Atlantic Rim (recreation), Big Creek (rec.), Elk Mountain (for., rec.), Ferris Mountains (rec.), Little Medicine (for.), Miller Hill (rec.), Shirley Mountains (for., rec.); moderate—North Laramie River (for.), Pine Mountain-Split Rock (for.), Rawlins Uplift (rec.), Seminoe-Pathfinder (rec.), Toltec (for.), White Rock Canyon (for.); low—Seven Mile, Sugarloaf, Woodedge, (all for.) and Continental Divide Trail (rec.) (see map 12). This listing does not preclude consideration of acquisition of additional access as opportunities arise or as needs are identified.	**Access** The need for access is discussed under "Cultural Resources," "Forest Management," and "Recreation." The BLM would pursue opportunities to acquire or maintain legal access to the following areas, listed by level of importance: High—Atlantic Rim (recreation), Big Creek (rec.), Elk Mountain (for., rec.), Ferris Mountains (rec.), Miller Hill (rec.), Shirley Mountains (for., rec.); moderate—Rawlins Uplift (rec.), Seminoe-Pathfinder (rec.); low—Continental Divide Trail (rec.). This listing does not preclude consideration of acquisition of additional access as opportunities arise or as needs are identified.	**Access** Same as Alternative A	**Access** Same as Alternative A
	Withdrawals The planning area would be open to operation of the	**Withdrawals** The planning area would be open to operation of the	**Withdrawals** The planning area would be open to operation of the	**Withdrawals** The planning area would be open to operation of the

TABLE 1 (Continued)
COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
LANDS PROGRAM (continued)	public land laws except for the 903,000 acres of existing withdrawals listed under Alternative A for locatable minerals, which segregate land from disposal or entry, including mineral location, and except for the 3,650,000 acres of existing withdrawals listed below, which segregate lands from disposal or entry but not from mineral location (see the Lands appendix).	public land laws except for the 903,000 acres of existing withdrawals and the 16,355 acres of proposed new withdrawals listed under Alternative B for locatable minerals, which segregate land from disposal or entry, including mineral location, and except for the 3,650,000 acres of existing withdrawals listed below, which segregate lands from disposal or entry but not from mineral location (see the Lands appendix).	public land laws except for the 81,493 acres of existing withdrawals listed under Alternative C for locatable minerals, which segregate land from disposal or entry, including mineral location, and except for the 213,490 acres of existing withdrawals listed below, which segregate lands from disposal or entry but not from mineral location. The remaining existing withdrawals would be revoked (see the Lands appendix).	public land laws except for the 81,493 acres of existing withdrawals and the 1,570 acres of proposed new withdrawals listed under Alternative D for Locatable Minerals, which segregate land from disposal or entry, including mineral location, and except for the 213,490 acres of existing withdrawals listed below, which segregate lands from disposal or entry but not from mineral location. The remaining existing withdrawals would be revoked (see the Lands appendix and maps 13, 14, and 15).
	C&MU[1] 3,641,500 Power sites 5,150 Stock driveways 263,258 Public water reserves—see "Locatable Minerals."	C&MU[1] 3,641,500 Power sites 5,150 Stock driveways 263,258 Public water reserves—see "Locatable Minerals."	C&MU[1] 0 Power sites 5,150 Stock driveways 193,983 Public water reserves 14,357	C&MU[1] 0 Power sites 5,150 Stock driveways 193,983 Public water reserves 14,357
	The stock driveway withdrawals lie, for the most part, on the same lands as the C&MU classification. Most of the 903,000 acres listed in "Locatable Minerals" overlie the 3,650,000 acres of withdrawals listed above.	The stock driveway withdrawals lie, for the most part, on the same lands as the C&MU classification. Most of the 919,355 acres listed in "Locatable Minerals" overlie the 3,650,000 acres of withdrawals listed above.	There is minimal overlap among these withdrawals.	Same as Alternative C
LIVESTOCK GRAZING MANAGEMENT	**Area Covered**	**Area Covered**	**Area Covered**	**Area Covered**
	Grazing management decisions for the portions of the planning area covered by the Divide RPS and the Seven Lakes RPS will continue unchanged (see map 2). Actions will be taken to maintain or improve forage availability and ecological	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)
COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
LIVESTOCK GRAZING MANAGEMENT (continued)	condition in those areas on the basis of monitoring information. The objective and management actions that follow pertain to the Medicine Bow grazing EIS area.			
	Objective: To maintain present grazing levels and management direction.	Objective: To manage livestock grazing to enhance wildlife, watershed, and riparian values.	Objective: To enhance livestock grazing while maintaining other resource values.	Objective: To enhance livestock grazing while maintaining a balance between economic use and management to enhance watershed and riparian areas.
	Management Actions: Livestock use would be authorized up to the active preference level upon demand (161,464 AUMs)	Management Actions: Authorized livestock use would be 145,109 AUMs. No adjustments would be made until adequate data are acquired through monitoring.	Management Actions: Authorized livestock use would be 190,969 AUMs. No adjustments would be made until adequate data are acquired through monitoring.	Management Actions: Authorized livestock use would be 186,940 AUMs. No adjustments would be made until adequate data are acquired through monitoring.
	Livestock grazing would continue to be excluded from the Pennock Mountain big game winter range.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	No additional areas would be excluded from grazing under this alternative.	In addition to above exclusion, livestock grazing would be excluded from crucial winter ranges for big game and from other important habitats as shown on maps 58, 59, and 60. This would affect 13,140 acres and 2,190 AUMs.	Same as Alternative A	In addition to above exclusion, livestock grazing would be excluded from crucial winter ranges for big game and from other important habitats as shown on maps 58, 59, and 60. This would affect 1,120 acres and 187 AUMs.
	Livestock grazing would not be excluded from any riparian areas under this alternative, and no systems for improvement of riparian areas would be developed.	Livestock grazing would be excluded from 436 acres of riparian areas until they improved sufficiently to support limited seasonal grazing. Grazing systems would be developed to include riparian pastures or other treatments to improve 1,289 acres of riparian areas.	Grazing systems would be developed to include riparian pastures or other treatments to improve 1,725 acres of riparian areas.	Livestock grazing would be excluded from 67 acres of riparian areas until they improved sufficiently to support limited seasonal grazing. Grazing systems would be developed to include riparian pastures or other treatments to improve 1,658 acres of riparian areas.
	No AMPs would be developed under this alternative.	New AMPs for "I" category allotments would be developed	New AMPs for "I" category allotments would be developed	New AMPs for "I" category allotments would be developed

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
LIVESTOCK GRAZING MANAGEMENT (continued)	Existing AMPs would be maintained.	to enhance wildlife, watershed, and riparian values while reducing livestock conflicts with other resources. Existing AMPs would be maintained.	to enhance livestock grazing by increasing the number of AUMs available for livestock use while maintaining other resource values. Existing AMPs would be maintained.	to enhance livestock grazing by increasing the number of AUMs available for all grazing animals while protecting or enhancing sensitive resource values. Existing AMPs would be maintained.
	Big game crucial winter range and other important habitats (13,140 acres) would not receive special attention for maintenance of wildlife habitat.	As mentioned previously, livestock grazing would be excluded from 13,140 acres of big game crucial winter range and other important habitats.	Special attention for maintenance of wildlife habitat would be given to 13,140 acres of big game crucial winter range and other important habitats.	Special attention for maintenance of wildlife habitat would be given to 12,020 acres of big game crucial winter range and other important habitats.
	No grazing systems would be proposed under this alternative.	Grazing systems would be designed to achieve the livestock grazing objective of Alternative B (see Livestock Grazing appendix for allotment-specific actions).	Grazing systems would be designed to achieve the livestock grazing objective of Alternative C (see Livestock Grazing appendix for allotment-specific actions).	Grazing systems would be designed to achieve the livestock grazing objective of Alternative D (see Livestock Grazing appendix for allotment-specific actions).
	No specific grazing treatments would be proposed under this alternative.	For all "M," "I," and "C" category allotments now being grazed prior to range readiness, grazing treatments would be implemented that would eliminate grazing during the critical spring growth period.	Grazing treatments designed to meet the objectives of Alternative C would be incorporated into the grazing systems for AMPs in "I" category allotments.	Grazing treatments designed to meet the objectives of Alternative D would be incorporated into the grazing systems for AMPs in "I" category allotments.
	Additional unplanned or unscheduled range improvements would be implemented to resolve site-specific problems as necessary to maintain existing management plans.	Range improvements to resolve conflicts and achieve the livestock grazing objectives of Alternative B are projected to be 157 miles of fence, 113 water developments, and 43,745 acres of vegetation manipulation. Vegetation manipulation techniques would include the use of fire.	Range improvements designed to achieve livestock grazing objectives of Alternative C are projected to be 115 miles of fence, 113 water developments, and 69,808 acres of vegetation manipulation. Vegetation manipulation techniques would include the use of fire.	Range improvements designed to achieve livestock grazing objectives of Alternative D are projected to be 130 miles of fence, 113 water developments, and 69,808 acres of vegetation manipulation. Vegetation manipulation techniques would include the use of fire.
	Requests for changes in seasons of use or kind of livestock would be considered case by case. These requests	Requests for changes in seasons of use or kind of livestock would be considered case by case. In addition,	Same as Alternative B	Same as Alternative B

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
LIVESTOCK GRAZING MANAGEMENT (continued)	would be approved if they would not increase the present level of AUMs.	requests for changes in kind of livestock from sheep to cattle would be considered with management actions to maintain or improve riparian condition.		
MINERALS MANAGEMENT	**Leasable Minerals—Coal**	**Leasable Minerals—Coal**	**Leasable Minerals—Coal**	**Leasable Minerals—Coal**
	Objective: To make available to the Green River-Hams Fork Regional Coal Team for lease consideration all of the coal with development potential that was considered in the Round Two EIS for this region. The Coal appendix contains detailed information on the coal screening process and special mitigative measures.	Objective: Same as Alternative A, plus to expand the Indian Springs area to make it a viable coal project area. The Coal appendix contains detailed information on the coal screening process and special mitigative measures.	Objective: Same as Alternative B, plus to make decisions on two areas that were deferred in the 1982 Divide/Overland area coal plan amendment. The Coal appendix contains detailed information on the coal screening process and special mitigative measures.	Same as Alternative C
	Development Sequence: As coal leasing needs are identified through coal activity planning, the concept of a north-to-south coal development sequence would be pursued in the entire area west of Rawlins and south of I-80. Coal development in the southern part of that area might strain the capability of communities there to accommodate growth rather than directing population to communities in the northern part, where development is needed.	Development Sequence: Same as Alternative A	Development Sequence: Same as Alternative A	Development Sequence: Same as Alternative A
	The development sequence described above depends on the Savery PRLAs not being developed in the foreseeable future. (Issuance of leases is independent of this plan and therefore will not be	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)	addressed here.) Should a PRLA eventually result in a coal lease, development of that lease must be viewed in the light of sensitive environmental and socioeconomic concerns. One possible way to protect these concerns would be avoidance of coal development on these PRLA lands. To this end, the BLM might consider an exchange, but only after the applicant acquires a lease by demonstrating the presence of commercial quantities of coal that are economically developable.			
	Coal Considered for Leasing:	**Coal Considered for Leasing:**	**Coal considered for Leasing:**	**Coal Considered for Leasing:**
	1. A total of 1,280 acres of public land containing 1.7 million tons of coal (Wild Horse Draw) would be acceptable for further consideration for leasing.	1. Same as Alternative A	1. Same as Alternative A	1. Same as Alternative A
	2. A total of 9,720 acres of public land containing 40.6 million tons of coal (Red Rim) would be acceptable for further consideration for leasing (see the Coal appendix for information on the Red Rim unsuitability petition decision).	2. Same as Alternative A	2. Same as Alternative A	2. Same as Alternative A
	3. A total of 6,240 acres of public land containing 73.9 million tons of coal (China Butte) would be acceptable for further consideration for leasing.	3. Same as Alternative A	3. Same as Alternative A	3. Same as Alternative A

TABLE 1 (Continued)
COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)	4. A total of 30,040 acres of public land containing 191.0 million tons of coal (Hanna Basin) would be acceptable for further consideration for leasing.	4. Same as Alternative A	4. Same as Alternative A	4. Same as Alternative A
	5. A total of 2,500 acres of public land containing 25.0 million tons of coal (Indian Springs) would be acceptable for further consideration for leasing for in situ coal development only.	5. Same as Alternative A	5. Same as Alternative A	5. Same as Alternative A
	6. The North Indian Springs area would not be considered for leasing.	6. A total of 3,840 acres of public land containing 25.0 million tons of coal would be acceptable for further consideration for leasing for in situ coal development only (North Indian Springs).	6. Same as Alternative B	6. Same as Alternative B
	7. The decision on 3,650 acres of public land containing 79.1 million tons of coal (Atlantic Rim) would be deferred.	7. Same as Alternative A	7. A total of 3,650 acres of public land containing 79.1 million tons of coal would be acceptable for further consideration for leasing (Atlantic Rim).	7. Same as Alternative C
	8. The decision on 7,325 acres of public land containing 201.8 million tons of coal (Northeast Cow Creek) would be deferred.	8. Same as Alternative A	8. A total of 82.8 million tons of coal in the Northeast Cow Creek area (7,325 acres) would be acceptable for further consideration for leasing for subsurface mining methods only.	8. Same as Alternative C
	Coal Unacceptable for Consideration: A total of 3,530 acres of public land containing 22.5 million tons of coal would be	Coal Unacceptable for Consideration: Same as Alternative A	Coal Unacceptable for Consideration: Same as Alternative A plus 119 million tons of coal in the Northeast Cow Creek area	Coal Unacceptable for Consideration: Same as Alternative A plus 119 million tons of coal in the Northeast Cow Creek area

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)	unacceptable for further consideration for leasing.		(7,325 acres) would not be acceptable for leasing consideration for surface mining methods.	(7,325 acres) would not be acceptable for leasing consideration for surface mining methods.
	Leasable Minerals--Oil and Gas	**Leasable Minerals--Oil and Gas**	**Leasable Minerals--Oil and Gas**	**Leasable Minerals--Oil and Gas**
	(The acreages in this section are not additive because of overlap. See note at end of table, and figure 4.)			
	Objective: To provide for leasing, exploration, and development of oil and gas while protecting other resource values.	Objective: To provide for leasing, exploration, and development of oil and gas with restrictions on surface-disturbing activities to resolve resource conflicts.	Objective: To emphasize leasing, exploration, and development of oil and gas in KGS areas by minimizing restrictions on surface-disturbing activities. In non-KGS areas, the objective would be the same as that of Alternative A.	Objective: Same as Alternative A
	Management Actions: Five million acres would be open to leasing subject to standard stipulations (see the Standard Protection Requirements appendix). These stipulations would affect leases issued on the areas listed below.	Management Actions: Five million acres would be open to leasing subject to standard stipulations (see the Standard Protection Requirements appendix). These stipulations would affect leases issued on the areas listed below.	Management Actions: A total of 3.5 million acres with high, moderate, low, or no potential for oil and gas would be open to leasing subject to standard stipulations (see the Standard Protection Requirements appendix). These stipulations would affect leases issued on the areas listed below.	Management Actions: Five million acres would be open to leasing subject to standard stipulations (see the Standard Protection Requirements appendix). These stipulations would affect leases issued on the areas listed below.
	Leases would be issued with restrictions to protect the following resources on the acreages listed:	Leases would be issued with restrictions to protect the following resources on the acreages listed:	Leases would be issued with restrictions to protect the following resources on the acreages listed:	Leases would be issued with restrictions to protect the following resources on the acreages listed:
	Steep slopes 320,000	Steep slopes 320,000	Steep slopes 224,000	Steep slopes 320,000
	Riparian areas and/or perennial surface water 140,000	Riparian areas, intermittent streams, ephemeral	Riparian areas and/or perennial surface water 98,000	Riparian areas and/or perennial surface water 140,000

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)		drainages, and perennial surface water 560,000		
	Historic trails 43,000 VRM Class I and Class II areas 194,000	Historic trails 43,000 VRM Class I and Class II areas 194,000	Historic trails 13,000 VRM Class I and Class II areas 183,000	Historic trails 43,000 VRM Class I and Class II areas 194,000
	Existing recreation sites 445	Existing and proposed recreation sites 560	Existing and proposed recreation sites 560	Existing and proposed recreation sites 560
	North Platte River SRMA (1/4mile on either side of the river) 3,550	North Platte River SRMA (1/4 mile on either side of the river) 3,550	North Platte River SRMA (1/4 mile on either side of the river) 3,550	North Platte River SRMA (1/4 mile on either side of the river) 3,550
	Special management areas, as follows:	Special management areas, as follows:	Special management areas, as follows:	Special management areas, as follows:
	Sage grouse leks 22,900 High priority wildlife habitat 118,000	Sage grouse leks 22,900 High priority wildlife habitat 240,000 Raptor concentration areas (ACECs; see map 61) 52,200 Baggs crucial winter range for elk (ACEC) 79,000	Sage grouse leks 19,886 High priority wildlife habitat 115,540 Raptor concentration areas (ACECs) 62,000	Sage grouse leks 22,900 High priority wildlife habitat 240,000 Raptor concentration areas (see map 62) 52,200 Baggs crucial winter range for elk 79,000
	I.4 million acres would be leased with seasonal restrictions to protect wildlife during critical periods (including raptor concentration areas totaling 100,000 acres—see map 57).	1.4 million acres would be leased with seasonal restrictions to protect wildlife during critical periods (including raptor concentration areas totaling 20,300 acres—see map 61).	895,000 acres would be leased with seasonal restrictions to protect wildlife during critical periods.	I.4 million acres would be leased with seasonal restrictions to protect wildlife during critical periods (including raptor concentration areas totaling 20,300 acres—see map 62).
	Oil and gas leasing would be allowed in the Sand Hills area (8,300 acres), the Como Bluff area (1,760 acres), and the raptor concentration areas (100,000 acres) subject to standard stipulations.	37,560 acres would be closed to oil and gas leasing to protect resource values in the Sand Hills area (wildlife and watershed values on 8,300 acres) and Como Bluff (paleontological and historical values on 1,760 acres), and in raptor concentration areas	Oil and gas leasing would be allowed in the Sand Hills area (ACEC—8,300 acres), the Como Bluff area (ACEC—1,760 acres), and the raptor concentration areas) subject to standard stipulations. In addition, surface-disturbing activities would be restricted and intensively	Oil and gas leasing would be allowed in the Sand Hills area (ACEC—8,300 acres), the Como Bluff area (ACEC—1,760 acres), and the raptor concentration areas (ACECs—27,500 acres and non-ACECs 72,500 acres; see map 62) subject to standard stipulations. In addition,

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)		(ACECs—27,500 acres; see map 61). Oil and gas leasing would be allowed, subject to standard stipulations, in the remaining 72,500 acres of raptor concentration areas, of which 52,200 acres would be ACECs in which surface-disturbing activities would be restricted and intensively managed to maintain raptor habitat (see ACEC section).	managed to maintain important resource values in these areas (see ACEC section).	surface-disturbing activities would be restricted and intensively managed to maintain important resource values in the ACECs (see ACEC section).
	The management actions described above would apply both within and outside KGS areas.	Same as Alternative A	KGSs—The 1.5 million acres not covered in the above action (for high, moderate, low, or no oil and gas potential lands) lie within KGS areas and would be leased as follows: No seasonal restrictions would be applied except to protect threatened or endangered species or migratory birds. Surface disturbance restrictions would be used only to protect significant cultural/natural history resources or threatened or endangered species and migratory birds, including raptor concentration areas, of which 38,000 acres lie within KGS areas.	Same as Alternative A
	The management actions described above would apply both within and outside KGS areas.	Same as Alternative A	Production activities would be subject to specific placement and design of pads, roads, and facilities to minimize acreage disturbed. Priority would be given to	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)			maximizing the economic recovery of the oil and gas resource.	
	The management actions described above would apply both within and outside KGS areas.	Same as Alternative A	Development plans would be required for operations within sensitive areas so that adverse impacts to surface values would be minimized. Development plans would also have the potential to reduce aggregate road and pipeline construction costs.	Same as Alternative A
	All lands open to oil and gas leasing also would be available for geophysical exploration, subject to the standard surface protection measures used for oil and gas leasing in the area.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Leasable Minerals--Other	**Leasable Minerals--Other**	**Leasable Minerals--Other**	**Leasable Minerals--Other**
	The planning area would be open to leasing of oil shale, geothermal resources, and nonenergy leasable minerals. Applications would be considered case by case. Stipulations to protect important surface values would be based on interdisciplinary review of individual proposals.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Locatable Minerals	**Locatable Minerals**	**Locatable Minerals**	**Locatable Minerals**
	Objective: To provide opportunities for locatable mineral entry and development while prohibiting entry on lands withdrawn for specific purposes.	Objective: Same as Alternative A	Objective: Same as Alternative A	Objective: Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)	Management Actions: The planning area would be open to locatable minerals entry except for 903,000 acres of existing withdrawals listed below (see the Lands appendix).	Management Actions: The planning area would be open to locatable minerals entry except for 903,000 acres of existing withdrawals and 16,355 acres of proposed new withdrawals, for a total of 919,355 acres of withdrawals (see the Lands appendix).	Management Actions: The planning area would be open to locatable minerals entry except for continuation of 81,493 acres of existing withdrawals listed below (see the Lands appendix).	Management Actions: The planning area would be open to locatable minerals entry except for continuation of 81,493 acres of existing withdrawals, 970 acres of proposed new withdrawals, and 600 acres of C&MU Act withdrawals[1] that would be continued under FLPMA, for a total of 83,063 acres of withdrawals (see the Lands appendix).
	Existing Withdrawals: (The acreages in this section are not additive because of overlap. See note at end of table.)	Existing withdrawals would be the same as those listed for Alternative A.	Existing Withdrawals to Be Retained:	Existing withdrawals to be retained would be the same as those listed for Alternative C. The remaining existing withdrawals would be revoked.
	Stratton hydrology study 2,694 Reclamation withdrawals (BOR) 73,290 Administrative sites 813 Air Navigation sites (FAA) 440 R&PP (leases held) 1,144 R&PP (classified only) 4,197 Public water reserves 41,245 Wildlife refuges (FWS) 3,915 Small tracts 15 Oil shale 564,758 Coal classifications 671,768 Coal withdrawals 610,170 C&MU[1] areas below: 3,916 Bennett Peak and Corral Creek (810), Shirley Mountain (560), Pryor Flat (40), Rattlesnake Creek (180), North Platte River (1,096), Halleck Creek (160), Teton		Stratton hydrology study 2,694 Reclamation Withdrawals (BOR) 73,290 Administrative site 10 Air navigation sites (FAA) 440 R&PP (leases held) 1,144 Wildlife refuges (FWS) 3,915 The remaining existing withdrawals would be revoked.	

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)	Reservoir (320), Antelope Reservoir (100), Dugway (420), Nine Mile Hill (90), Miller Hill Lake (20), Unnamed well 9 miles west of Rawlins (40), and Flowing Well Luman Road (80)			
	Portions of the coal classifications, coal withdrawals, and oil shale withdrawals overlap. The public water reserves, coal classifications, and coal withdrawals segregate only against nonmetalliferous mineral location.			
	No new withdrawals would be proposed.	Proposed new withdrawals: Bennett Peak area 1,550 Big Creek area 795 Big Creek RS 5 Encampment River RS 10 Prospect Creek RS 5 Jelm Mountain RS 10 Battle Mountain RS 40 Historic Trails (Overland, Cherokee, and Fort Washakie) 11,000 Como Bluff 2,720 Muddy Gap cushion plant community 220	No new withdrawals would be proposed.	Proposed new withdrawals: Bennett Peak RS 20 Big Creek RS 5 Encampment River RS 10 Prospect Creek RS 5 Jelm Mountain RS 10 Battle Mountain RS 40 Overland Trail sites (see Historic Trail folded map) 880
	All C&MU Act withdrawals would be continued (see "Existing Withdrawals," above).	All C&MU Act withdrawals would be continued (see "Existing Withdrawals," above).	C&MU Act withdrawals would not be continued.	The following C&MU Act withdrawals would be continued under FLPMA: Corral Creek RS 20 Teton Reservoir RS 160 Pryor Flats RS 40 Dugway RS 320 Nine Mile Hill RS 40 Shirley Mountains RS 20

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
MINERALS MANAGEMENT (continued)				
	Plans of operations or notices of intent would be required for locatable mineral exploration and development (except casual use) consistent with regulations. (A plan of operations would be required for disturbance of more than 5 acres.)	Plans of operations would be required for locatable minerals activities that would cause surface disturbance (except casual use), regardless of the size of the disturbance, in ACECs for acreages listed below. Raptor concentration areas 79,700 Baggs elk crucial winter range 79,000 Pelican island 12	Plans of operations would be required for locatable minerals activities that would cause surface disturbance (except casual use), regardless of the size of the disturbance, in ACECs for acreages listed below. Raptor concentration areas 100,000 Como Bluff 1,760 Sand Hills 8,300 Muddy Gap cushion plant community 220 Gibben's beardtongue 10	Plans of operations would be required for locatable minerals activities that would cause surface disturbance (except casual use), regardless of the size of the disturbance, in ACECs for acreages listed below. Raptor concentration areas 27,500 Como Bluff 1,760 Sand Hills 8,300
	Salable Minerals	**Salable Minerals**	**Salable Minerals**	**Salable Minerals**
	The objective is to provide common variety mineral materials in convenient locations for users while protecting surface resources.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Mineral materials may be disposed of upon application or at the initiative of the District Manager. Disposal will be approved or disapproved case by case. Stipulations to protect important surface values will be based on interdisciplinary review of individual proposals.	Same as Alternative A	Same as Alternative A	Same as Alternative A
RECREATION MANAGEMENT	Objectives: The primary objective would be to ensure the continued availability of outdoor recreational opportunities sought by the public. Other objectives are to protect	Objectives: Same as Alternative A	Objectives: Same as Alternative A	Objectives: Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
RECREATION MANAGEMENT (continued)	resources, to meet legal requirements for the health and safety of visitors, and to mitigate conflicts between different types of resource uses.			
	Recreation Sites	**Recreation Sites**	**Recreation Sites**	**Recreation Sites**
	Existing recreation sites that would be subject to continued management are Bennett Peak, Corral Creek, Teton Reservoir, and Pryor Flat campgrounds, Dugway campground and boat launch, Encampment River campground and trailhead, and undeveloped sites at Nine Mile Hill and Big Creek.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	New recreation site developments, in priority order, would be a boat launch and a picnic area at Prospect Creek and campgrounds at Shirley Mountains, Battle Mountain, and Jelm Mountain.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Special Recreation Management Areas	**Special Recreation Management Areas**	**Special Recreation Management Areas**	**Special Recreation Management Areas**
	The following SRMAs would be developed (see map 28).			
	Continental Divide National Scenic Trail: This SRMA covers 80 miles of trail through BLM-administered public land. The trail would be managed to provide opportunities for trail users to view the diverse topographic, geologic, vegetative, and scenic phenomena that characterize	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
RECREATION MANAGEMENT (continued)	the Continental Divide and to view examples of human use of the resources. The exact route would be located through activity planning, which also would determine where easements or rights-of-way would be needed on private land.			
	North Platte River: This 3,550-acre SRMA would be managed to provide high quality recreational opportunities, especially boating, fishing, camping, and sightseeing, and to provide facilities and continued public access. Surface-disturbing activities within 1/4 mile on either side of the river would be restricted to maintain the quality of the visual resources. If the Bureau of Reclamation withdrawal for Seminoe and Pathfinder reservoirs and Miracle Mile should be revoked, all the acreage in those areas would be included in the SRMA.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Shirley Mountains Caves: This 24,800-acre SRMA would be managed to provide for protection and enjoyment of the cave system while other resource uses would be allowed above ground.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Off-Road Vehicle Management ORVs would be limited to existing roads and trails in the entire planning area except for the locations and	**Off-Road Vehicle Management** Same as Alternative A	**Off-Road Vehicle Management** Same as Alternative A	**Off-Road Vehicle Management** Same as Alternative A

TABLE 1 (Continued)
COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
RECREATION MANAGEMENT (continued)	acreages listed below. (ORV designations are defined in chapter 1.) (See map 16.)			
	Open Areas: Dune Ponds 150	Open Areas: Same as Alternative A	Open Areas: Same as Alternative A	Open Areas: Same as Alternative A
	Limited Areas: Sand Hills area (existing roads and trails) 8,300	Limited Areas: Sand Hills area (designated roads and trails) 8,300	Limited Areas: Same as Alternative B	Limited Areas: Sand Hills area (existing roads and trails, with rehabilitation or mitigation in specific problem areas) 8,300
	Access	**Access**	**Access**	**Access**
	The BLM would pursue opportunities to acquire or maintain legal access to the following areas to ensure continued availability of outdoor recreational opportunities for the public. The areas are listed by level of importance: High—Atlantic Rim, Big Creek, Elk Mountain, Ferris Mountains, Miller Hill, Shirley Mountains; moderate—Rawlins Uplift, Seminoe-Pathfinder; low—Continental Divide Trail.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Land Consolidation	**Land Consolidation**	**Land Consolidation**	**Land Consolidation**
	Consolidation of landownership in the Bennett Peak area would be considered to increase recreational opportunities on the North Platte River for the public. This action would have a high priority. In addition, consolidation of	Consolidation of landownership in the following areas would be considered to increase recreational opportunities for the public. The areas are listed by priority ranking: High—Bennett Peak, Dugway, Miracle Mile,	Consolidation of landownership would not be considered.	Same as Alternative B

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
RECREATION MANAGEMENT (continued)	landownership in the Elk Mountain area would be considered as opportunities arose so that recreational opportunities for elk and deer hunting could be increased.	North Platte River area; moderate—Dune Ponds, Elk Mountain, Shirley Mountains Caves; low—Bennett Mountains, Encampment River Canyon, Ferris Mountains.		
SOILS, WATER, AND AIR MANAGEMENT	Objectives: To prevent deterioration of air quality that would exceed Wyoming and National Ambient Air Quality Standards, and to preserve scenic values that could be impaired by total suspended particulates released into the air.	Objectives: Same as Alternative A	Objectives: Same as Alternative A	Objectives: Same as Alternative A
	To maintain soil cover and productivity where they are adequate, and to increase soil cover and productivity where they are in a downward trend.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	To maintain riparian areas in good or excellent condition and improve areas that are being degraded.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	To control flood and sediment damage from natural or unnatural causes.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	To reduce salt loading in watersheds that lie within the Colorado River Basin.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	To meet or exceed established standards for quality of surface water and groundwater where water quality has been degraded by unnatural causes.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	To provide for physical and legal availability of water.	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
SOILS, WATER, AND AIR MANAGEMENT (continued)	Management Actions: Intensive land use management practices would be implemented and monitored to mitigate salt and sediment loading caused by surface-disturbing activities in the Muddy Creek, Sage Creek, and Second and Third Sand Creek crucial watersheds. Intensive management and monitoring also would be implemented in the Little Snake River Basin, excluding the Muddy Creek watershed, as problems were identified. More information is available in the Soil, Water, and Air appendix.	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A
	The priority order for solving watershed problems would be first, Muddy Creek; second, Sage Creek; third, Second and Third Sand creeks; and fourth, the Little Snake River Basin, excluding the Muddy Creek watershed. Watershed management plans would be prepared for these areas. Other watersheds could be added if problems were identified.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Surface-disturbing activities would be prohibited on unstable areas unless it could be demonstrated that the hazard could be overcome. Specific unstable areas such as landslides, slumps, and areas exhibiting soil creep would be identified individually.	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
SOILS, WATER, AND AIR MANAGEMENT (continued)	Unstable areas are known to occur within the lands identified on map 32.			
VEGETATION MANAGEMENT	**Forests, Rangeland, and Riparian Areas** Most management actions that would affect forest, rangeland, and riparian vegetation are described in the sections of this table for fire management; forest management; livestock grazing management; recreation management; soils, water, and air management; and wildlife habitat and fisheries management.	**Forests, Rangeland, and Riparian Areas** Same as Alternative A	**Forests, Rangeland, and Riparian Areas** Same as Alternative A	**Forests, Rangeland, and Riparian Areas** Same as Alternative A
	Rare Plants Objective: To continue present management of three known rare plant areas.	**Rare Plants** Objective: To manage three known rare plant populations to maintain or enhance the populations.	**Rare Plants** Objective: Same as Alternative B	**Rare Plants** Objective: Same as Alternative B
	Management Actions: The known population of Gibben's beardtongue (*Penstemon gibbensii*) in the southwest part of the planning area would be protected from disturbance by maintenance of existing fencing around the population. Established trend studies would be continued. See the "ACECs" section for information on management actions by alternative.	Management Actions: The management of Gibben's beardtongue would be the same as under Alternative A.	Management Actions: The management of Gibben's beardtongue would be the same as under Alternative A.	Management Actions: The management of Gibben's beardtongue would be the same as under Alternative A.

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
VEGETATION MANAGEMENT (continued)	There would be no special management for populations of persistent sepal yellowcress (*Rorippa calycina*) near Seminoe Reservoir.	The BLM would coordinate with the Bureau of Reclamation to monitor populations of persistent sepal yellowcress and with county weed and pest control districts to ensure that populations of the plant would not be affected by weed control programs.	The management of persistent sepal yellowcress would be the same as under Alternative B.	The management of persistent sepal yellowcress would be the same as under Alternative B.
	There would be no special management for the Muddy Gap cushion plant community (detailed in the "Vegetation" section of chapter 3). See the "ACECs" section of this table for information on management actions by alternative.	The Muddy Gap cushion plant community area would be withdrawn from mineral location to protect it from disturbance. The BLM would coordinate with The Nature Conservancy to monitor the plant community. If monitoring indicated a need, additional protective measures would be taken as necessary to protect the community.	The management of the Muddy Gap cushion plant community would be the same as under Alternative B except that the area would not be withdrawn from mineral location.	Same as Alternative C
VISUAL RESOURCES MANAGEMENT	Objective: To minimize adverse effects on visual resources while maintaining the effectiveness of land-use allocations.	Objective: Same as Alternative A	Objective: For land outside KGS areas, same as Alternative A. Within KGS areas, oil and gas activities would have priority over visual resource management objectives.	Objective: Same as Alternative A
	Management Actions: The planning area would be managed according to the VRM classes shown on map 43. The four VRM classes are defined in the "Visual Resources" section of chapter 3. The acreages in each class are as follows: Class I 33,165 Class II 160,640 Class III 3,582,195 Class IV 224,000	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
WILD HORSE MANAGEMENT	Objectives: To protect, maintain, and control a viable, healthy herd of wild horses while retaining their free-roaming nature.	Objectives: Same as Alternative A	Objectives: Same as Alternative A	Objectives: Same as Alternative A
	To provide adequate habitat for free-roaming wild horses. Management will be consistent with environmental protection and enhancement policies.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Management Actions: Wild horses would be managed to meet the population objectives in existing activity plans for wild horse HMAs, as follows: Adobe Town HMA—minimum 300, maximum 500 Flat Top HMA—about 70 Seven Lakes HMA (portion within the planning area)—minimum 66, maximum 135, average 95	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A	Management Actions: Same as Alternative A
WILDLIFE HABITAT AND FISHERIES MANAGEMENT	Objectives: To coordinate with all other uses of land or water to develop and maintain wildlife and fish habitat at prescribed sustained levels to achieve the following aims:	Objectives: Same as Alternative A	Objectives: Same as Alternative A	Objectives: Same as Alternative A
	a. Prevention of significant damage to rangeland and forest fish and wildlife communities	Same as Alternative A	Same as Alternative A	Same as Alternative A
	b. Prevention and abatement of pollution	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
WILDLIFE HABITAT AND FISHERIES MANAGEMENT (continued)	c. Direction of cultural (vegetative) or management practices toward improved wildlife and fish habitat.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	To provide adequate habitat quality (food, cover, space, and water) to support the featured species of high state and federal interest and sensitive, threatened, and endangered species that inhabit the planning area and to support mutually agreed upon population levels established in the WGFD strategic plan.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	To comply with Endangered Species Act mandates to assist in recovery of T&E species and in meeting recovery plan goals.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Throughout the planning area, in high priority standard habitat sites and fisheries areas, to maintain or improve vegetation condition and/or to avoid long-term disturbance. (High priority standard habitat types are listed in table 23.)	Same as Alternative A	Outside KGS areas, objectives would be the same as those listed for the entire planning area under Alternative A. Within KGS areas, the objective would be to mitigate losses or disturbance of wildlife habitat where possible.	Same as Alternative A
	Throughout the planning area, in moderate and low priority standard habitat types, to maintain or improve overall ecological quality, thus providing good wildlife habitat within the constraints of multiple-use management. (Moderate and low priority standard habitat types are listed in table 23.)	Same as Alternative A	Outside KGS areas, objectives would be the same as those listed for the entire planning area under Alternative A. Within KGS areas, the objective would be to mitigate losses or disturbance of wildlife habitat where possible.	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
WILDLIFE HABITAT AND FISHERIES MANAGEMENT (continued)	Management Actions: There would be 11 habitat management areas (see maps 45 and 46), as follows: HMP areas—Baggs, Encampment Bighorn Sheep, Ferris/Seminoe, Red Desert, Sage Creek, and Shirley Mountains; cooperative management agreement areas—Chain Lakes, Laramie Peak game winter range, Pennock Mountain elk winter range, Sybille winter deer pasture, and Wick elk winter area. Outside these 11 areas, habitat management practices would be based on standard operating procedures and no special management actions would be taken.	Management Actions: There would be 12 habitat management areas (see maps 45 and 46). In addition to the 11 areas listed for Alternative A, a cooperative management agreement area would be proposed for the Dune Ponds. Outside these 12 areas, habitat management practices would be based on standard operating procedures and no special management actions would be taken.	Management Actions: There would be 16 habitat management areas (see maps 45 and 46). In addition to the 12 areas listed for Alternative B, HMP areas would be proposed for the Jelm Mountain, Laramie Peak, Saratoga Valley, and South Desert areas. Outside these 16 areas, habitat management practices would be based on standard operating procedures and no special management actions would be taken.	Management Actions: Same as Alternative C
	Site-specific objectives and types of management actions for wildlife (including the use of fire as a management tool) are described in the Wildlife appendix. (Some management actions for wildlife also are described in the sections of this table for ACECs, fire management, forest management, livestock grazing management, coal, oil and gas, locatable minerals, and recreation management.) The actions described in the Wildlife appendix would be taken on the following areas: 45 miles of stream (fishery) 350 acres of reservoirs 115,000 acres of elk crucial winter range	Site-specific objectives and types of management actions for wildlife (including the use of fire as a management tool) are described in the Wildlife appendix. (Some management actions for wildlife also are described in the sections of this table for ACECs, fire management, forest management, livestock grazing management, coal, oil and gas, locatable minerals, and recreation management.) The actions described in the Wildlife appendix would be taken on the following areas: 45 miles of stream (fishery) 475 acres of reservoirs 115,000 acres of elk crucial winter range	Site-specific objectives and types of management actions for wildlife (including the use of fire as a management tool) are described in the Wildlife appendix. (Some management actions for wildlife also are described in the sections of this table for ACECs, fire management, forest management, livestock grazing management, coal, oil and gas, locatable minerals, and recreation management.) The actions described in the Wildlife appendix would be taken on the following areas: 60 miles of stream (fishery) 545 acres of reservoirs 153,000 acres of elk crucial winter range	Same as Alternative B

TABLE 1 (Continued)
COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
WILDLIFE HABITAT AND FISHERIES MANAGEMENT (continued)	3,500 acres of bighorn sheep crucial winter range 140,000 acres of deer crucial winter range 92,000 acres of antelope crucial winter range 271,000 acres of raptor habitat 162,000 acres of high priority habitat, including wetlands and riparian zones.	3,500 acres of bighorn sheep crucial winter range 140,000 acres of deer crucial winter range 92,000 acres of antelope crucial winter range 271,000 acres of raptor habitat 243,000 acres of high priority habitat, including wetlands and riparian zones.	23,000 acres of bighorn sheep crucial winter range 288,000 acres of deer crucial winter range 146,000 acres of antelope crucial winter range 271,000 acres of raptor habitat 122,000 acres of high priority habitat, including wetlands and riparian zones.:	
	The resources in the Baggs elk crucial winter range (79,000 acres) would be managed to maintain the integrity of the crucial winter habitat for elk, allow for development of coal and oil and gas, and seek the cooperation of owners of adjacent property to manage the habitat. See the "ACECs" section for information on management actions by alternative.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Other crucial winter ranges for big game would be protected by the application of standard protection requirements for surface-disturbing activities. In addition, surface disturbance would be mitigated to restore and/or replace lost habitat.	Same as Alternative A	Outside KGS areas and coal development areas, management of other crucial winter ranges would be the same as under Alternative A. Within KGS areas and coal development areas, losses of crucial winter range would be mitigated through reclamation and off-site habitat acquisition and/or habitat development.	Same as Alternative A
	Identified high priority habitat would be protected by the application of standard	All high priority habitat would be protected by the application of standard	Within KGS areas and coal development areas, losses of high priority habitat would	Same as Alternative B

TABLE 1 (Continued)
COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
WILDLIFE HABITAT AND FISHERIES MANAGEMENT (continued)	protection requirements for surface-disturbing activities.	protection requirements for surface-disturbing activities.	be mitigated through reclamation and off-site habitat acquisition and/or habitat development. High priority habitat outside KGS areas and coal development areas would be protected by the application of standard protection requirements for surface-disturbing activities.	
	Sage grouse and sharp-tailed grouse strutting/dancing grounds and nesting habitat would be protected by the application of standard protection requirements for surface-disturbing activities.	Same as Alternative A	Within KGS areas, losses of sage grouse and sharp-tailed grouse strutting/dancing grounds and nesting habitat would be mitigated where possible. Outside KGS areas, standard protection requirements for surface-disturbing activities would be applied.	Same as Alternative A
	In raptor concentration areas (100,000 acres), resources would be managed to protect nesting raptor pairs during critical periods. See the "ACECs" section for information on management actions by alternative.	In raptor concentration areas (100,000 acres), resources would be managed to maintain the productivity of nesting raptor pairs, allow for development of coal and oil and gas, and seek the cooperation of owners of adjacent property to manage raptor nesting habitat. See the "ACECs" section for information on management actions by alternative.	Same as Alternative B	Same as Alternative B
	The resources in the Sand Hills area (8,300 acres) would be managed to protect the unique vegetation complex, maintain wildlife habitat values, minimize soil erosion, and promote recreational opportunities. See the "ACECs" section for	Same as Alternative A	Same as Alternative A	Same as Alternative A

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
WILDLIFE HABITAT AND FISHERIES MANAGEMENT (continued)	information on management actions by alternative.			
	Opportunities to improve riparian habitat for fisheries and wildlife throughout the planning area would be investigated and identified. Management actions (in addition to those identified in table WL-AP-2 in the Wildlife appendix) would be implemented to achieve improvements. It is estimated that riparian improvement areas comprise less than 1% of the planning area.	Grazing management actions implemented under AMPs for "I" category allotments would incorporate actions to improve riparian habitat. Opportunities for improving other riparian habitat for fisheries and wildlife outside "I" allotments would be investigated and identified. Management actions (in addition to those identified in table WL-AP-2 in the Wildlife appendix) would be implemented to achieve improvements. It is estimated that riparian improvement areas comprise less than 1% of the planning area.	Same as Alternative B	Same as Alternative B
	The resources on the 12-acre pelican island would be managed to maintain nesting habitat for a colony of white pelicans. See the "ACECs" section for information on management actions by alternative.	The resources on the 12-acre pelican island would be managed to maintain and enhance nesting habitat for a colony of white pelicans. See the "ACECs" section for information on management actions by alternative.	Same as Alternative B	Same as Alternative B
	Consolidation of landownership would not be considered.	To benefit the wildlife program, the BLM would consider consolidating public land to obtain important wildlife habitat areas such as (a) perennial streams, lakes, and wetlands (FWS also has identified this as a	Same as Alternative A	Same as Alternative B

TABLE 1 (Continued)

COMPARISON OF ALTERNATIVES

	Alternative A	Alternative B	Alternative C	Alternative D (Preferred)
WILDLIFE HABITAT AND FISHERIES MANAGEMENT (continued)		priority); (b) raptor concentration areas; (c) crucial winter range for bighorn sheep, elk, mule deer, or antelope; and (d) other high priority habitats.		

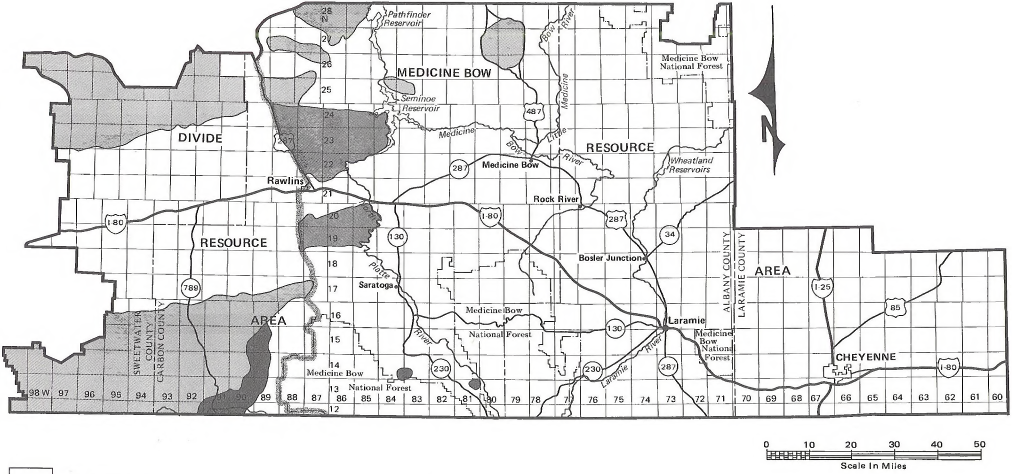
NOTE: Figures in lists and breakdowns may not add to totals shown because of rounding. Acreages shown for various protected areas such as steep slopes or crucial wildlife habitat may appear to equal larger amounts than totals given because of overlapping. See figure 4 for a graphic representation of overlapping protected areas.

ABBREVIATIONS: ACEC = area of critical environmental concern; AMP = allotment management plan; AUM = animal unit month; BOR = Bureau of Reclamation, U.S. Department of the Interior; C&MU = Classification and Multiple Use Act of 1964 (see footnote 1); FLPMA = Federal Land Policy and Management Act; FWS = Fish and Wildlife Service, U.S. Department of the Interior; HMA = herd management area; HMP - habitat management plan; KGS = known geologic structure; MBF = thousand board feet; MMBF = million board feet; NNL = national natural landmark; ORV = off-road vehicle; PRLA = preference right lease application; R&PP = Recreation and Public Purposes; RPS = rangeland program summary; RS = recreation site; SRMA = special recreation management area; WGFD = Wyoming Game and Fish Department.

[1] Classification and Multiple Use Act (C&MU) public land classification order W-6227, published in the *Federal Register* on November 8, 1967, classified approximately 3,641,500 acres of public land in the planning area for retention in federal ownership, for segregation from sale under section 2455 of the Revised Statutes (43 U.S.C. 1171), and from entry under the agricultural laws. In addition, 3,106 acres of important recreational sites and water sources were further segregated from entry under the 1872 General Mining Law. The BLM terminated this classification on July 28, 1982. Should the BLM prevail on appeal of Judge Pratt's preliminary injunction, which was issued in *National Wildlife Federation (NWF) v. Burford, et. al* (Civil Action No. 85-2238 D.C.D.C.), this termination will have been effective. The descriptions and analyses for Alternative C and Alternative D (the preferred alternative) consider the classification on these lands to be terminated.

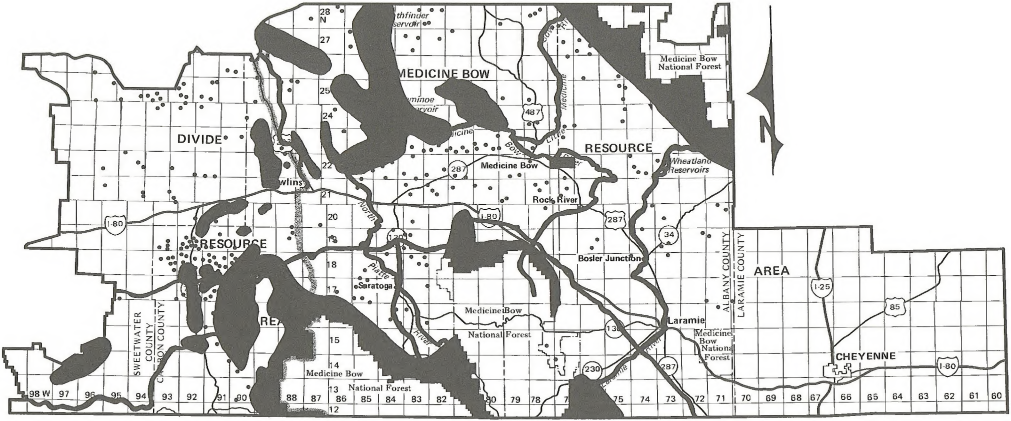
In addition, 810 acres under C&MU public land classification W-16495 was classified for retention and segregated from sale under section 2455 of the Revised Statutes (43 USC 1171), from entry under the agricultural laws, and from entry under the 1872 General Mining Law. This classification was reviewed and termination was recommended; however, a final termination order was not completed before initiation of the above-mentioned suit. The descriptions and analyses for Alternatives C and D (the preferred alternative) assume that classification W-16495 would be terminated.

Since Alternatives C and D consider W-6227 as terminated and would terminate W-16495, some of the important recreation sites that have C&MU protection under Alternatives A and B would need to be protected under Alternative D. Therefore, new withdrawal proposals (not previously presented) appear under Alternative D (the preferred alternative) as "C&MU Act Withdrawals to be continued under FLPMA."



☐	Full Suppression
▨	Limited Suppression
▨	Limited Suppression (Need Operator Consent)
■	Full Suppression with Management Alternatives

Map 3
FIRE MANAGEMENT
Medicine Bow-Divide Resource Management Plan



The following areas would be avoided, if possible, when permitting surface disturbing activities. If avoidance is not possible, each situation would be individually analyzed considering facility features and use, time of year, construction techniques and human presence. Impacts would be carefully mitigated by intensive reclamation, special construction techniques, etc.

Steep Slopes (not shown on map-covers 8% of planning area)

Riparian Areas/Surface Water (only main water bodies shown on map - covers 3½% of planning area)

High Priority Habitat (not shown on map - covers 6% of planning area - may overlap other areas)

⁘ Sage Grouse Strutting Grounds (locations on map are approximate - these areas will be avoided whether or not they are presently known)

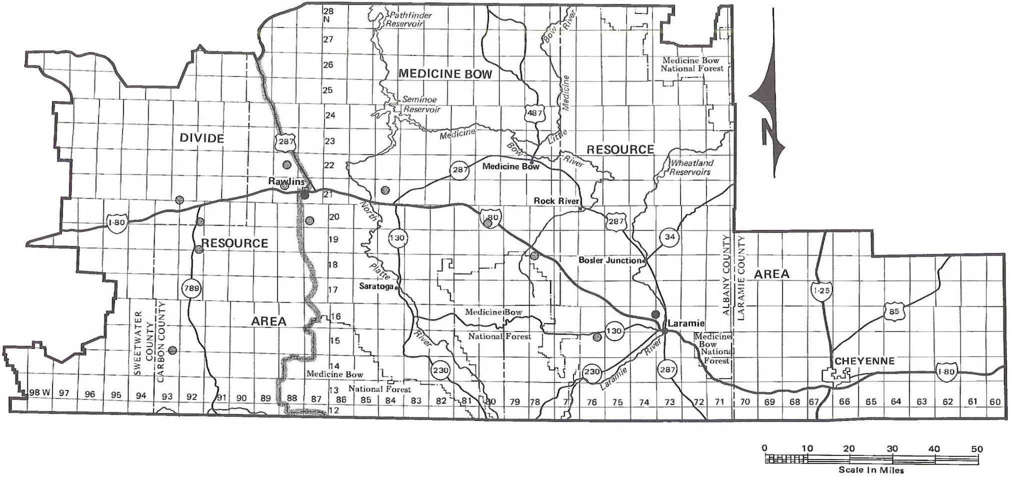
■ VRM Class I and II Areas, Baggs Elk Crucial Winter Range, Como Bluffs Natural History Site, Sand Hills Area, Historic Trails, Raptor Concentration Areas, and Recreation Areas.

0 10 20 30 40 50
Scale In Miles

Map 4

UTILITY/TRANSPORTATION SYSTEMS AVOIDANCE AREAS - PREFERRED ALTERNATIVE

Medicine Bow-Divide Resource Management Plan



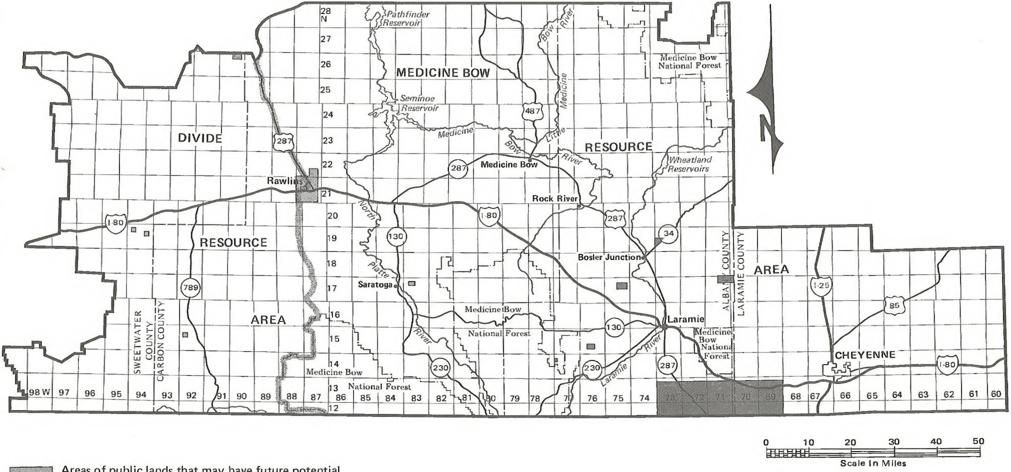
● High Power Communication Site

◍ Low Power Communication Site

Map 5

COMMUNICATION SITE CATEGORIES

Medicine Bow-Divide Resource Management Plan



░ Areas of public lands that may have future potential for disposal or transfer because they would meet important public objectives such as community expansion or economic development.

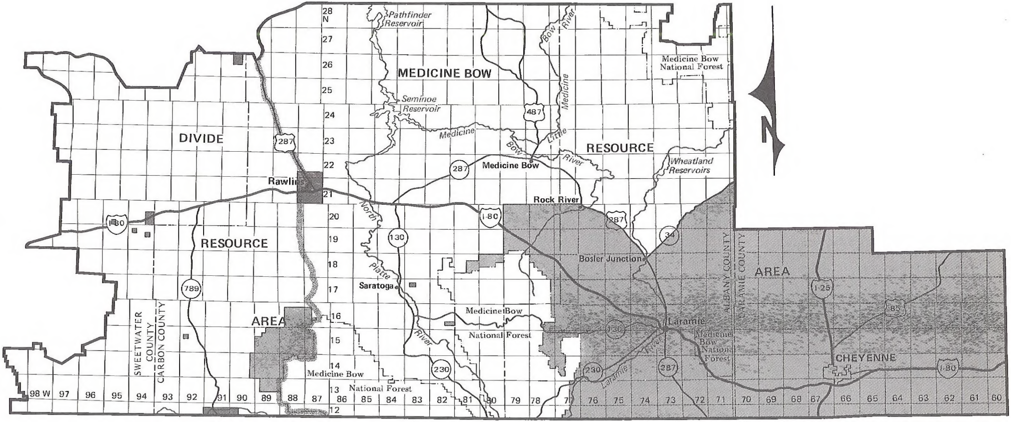
▓ Areas of public lands that may have future potential for disposal or transfer because they are isolated and difficult to manage.

NOTE: All public lands within delineated areas are identified for consideration as disposal parcels.

Map 6

LAND OWNERSHIP ADJUSTMENTS ALTERNATIVE A

Medicine Bow-Divide Resource Management Plan



▨ Areas of public lands that may have future potential for disposal or transfer because they would meet important public objectives such as community expansion or economic development.

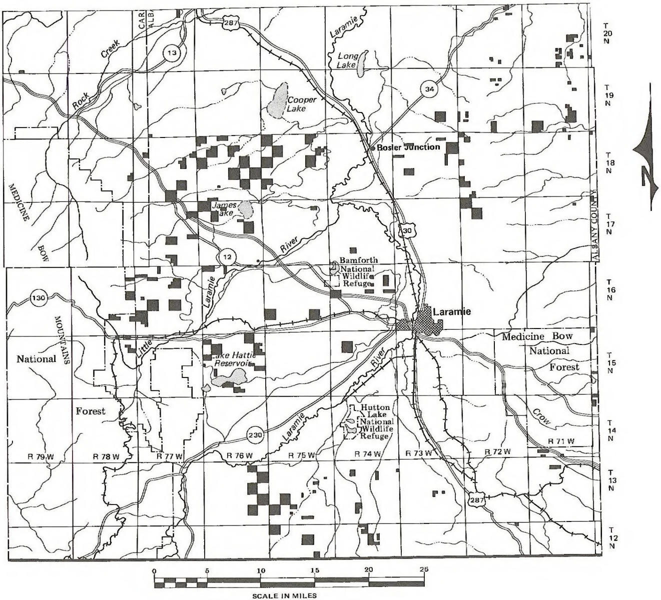
▨ Areas of public lands that may have future potential for disposal or transfer because they are isolated and difficult to manage.

NOTE: All public lands within delineated areas are identified for consideration as disposal parcels.

Map 7

LAND OWNERSHIP ADJUSTMENTS
ALTERNATIVE C

Medicine Bow-Divide Resource Management Plan

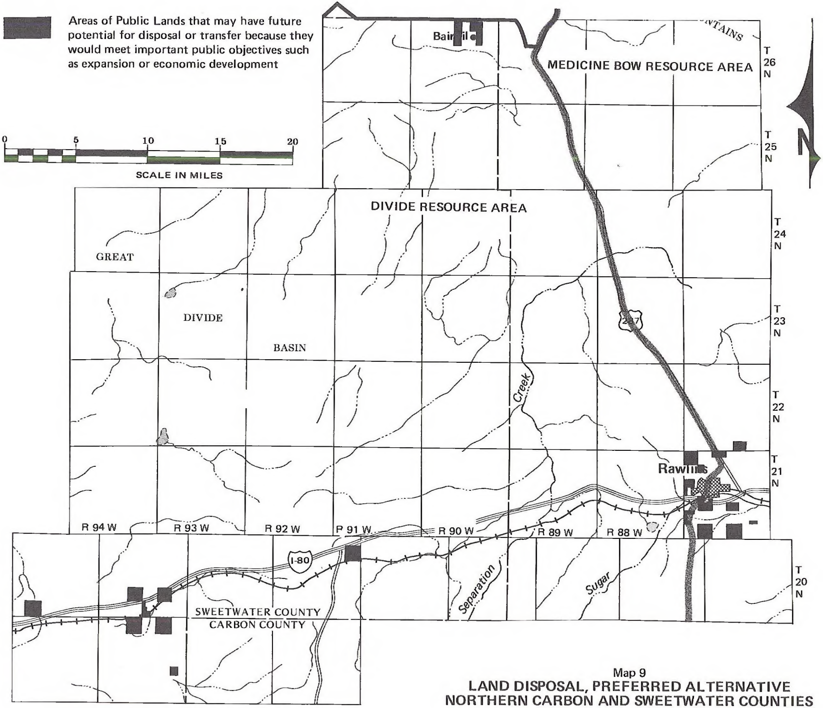


▨ Areas of Public Lands that may have future potential for disposal or transfer because they are isolated and difficult to manage

Map 8

LAND DISPOSAL, PREFERRED ALTERNATIVE ALBANY AND EASTERN CARBON COUNTIES

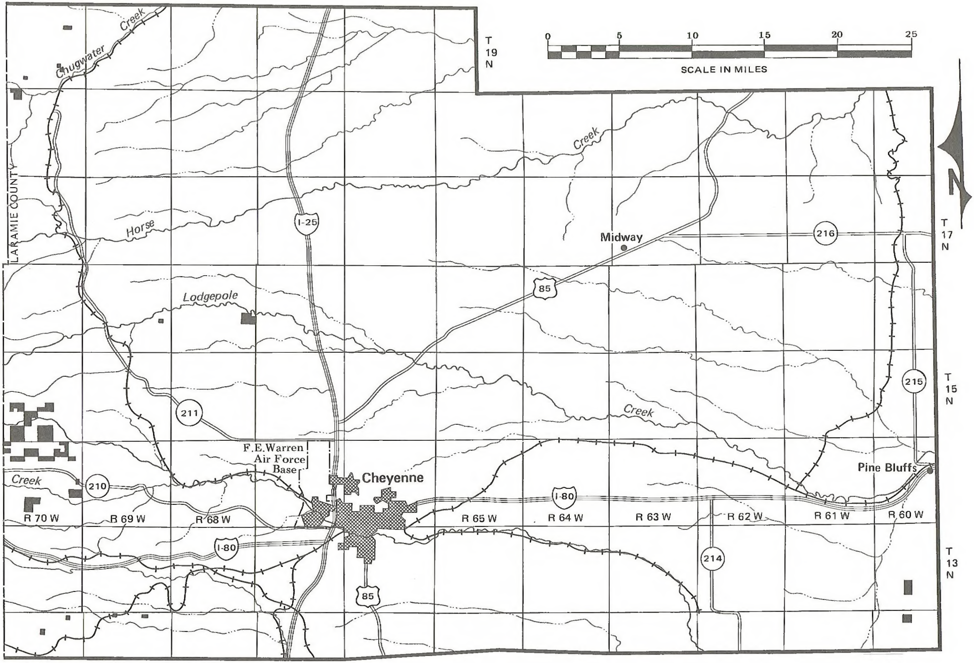
Medicine Bow-Divide Resource Management Plan



Map 9

LAND DISPOSAL, PREFERRED ALTERNATIVE NORTHERN CARBON AND SWEETWATER COUNTIES

Medicine Bow-Divide Resource Managment Plan

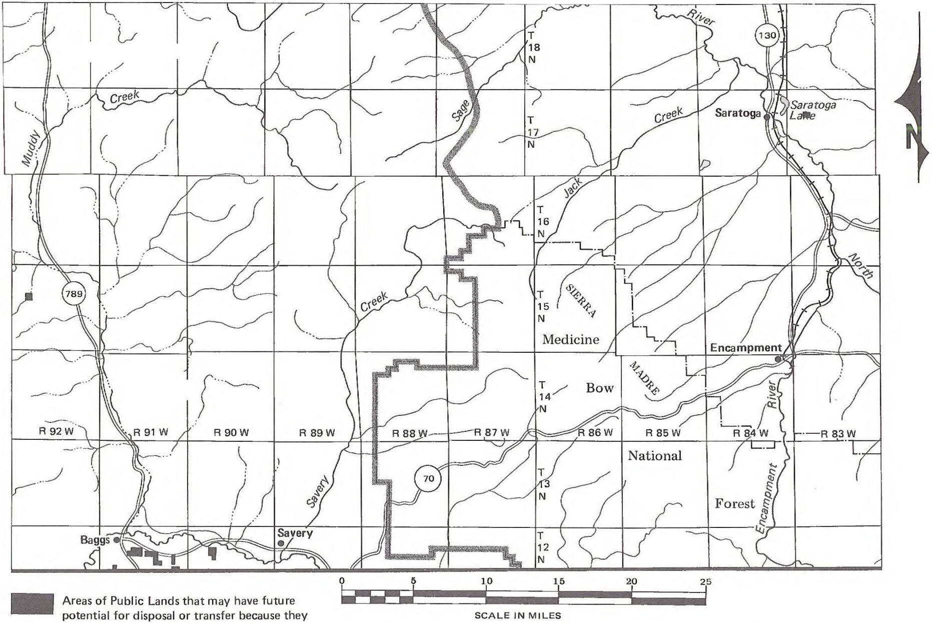


■ Areas of Public Lands that may have future potential for disposal or transfer because they are isolated and difficult to manage

Map 10

LAND DISPOSAL, PREFERRED ALTERNATIVE
LARAMIE COUNTY

Medicine Bow-Divide Resource Management Plan

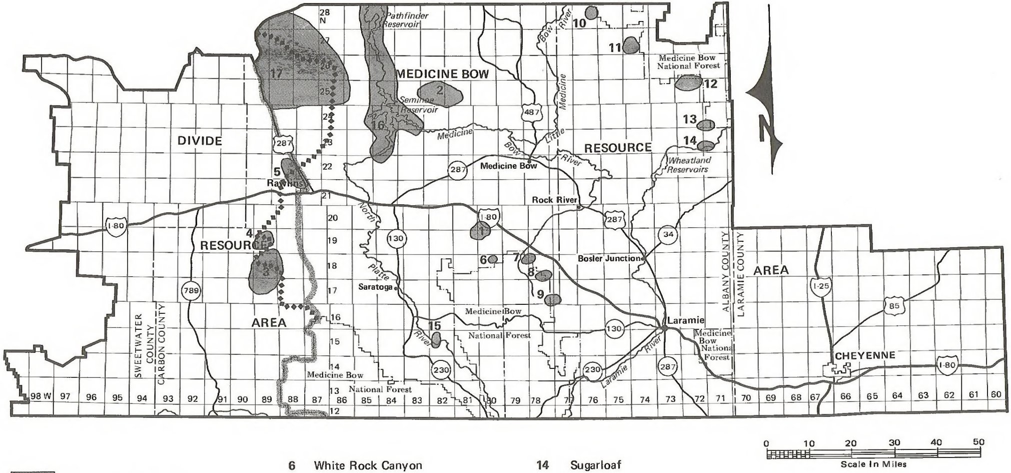


▨ Areas of Public Lands that may have future potential for disposal or transfer because they would meet important public objectives such as expansion or economic development

Map 11

LAND DISPOSAL, PREFERRED ALTERNATIVE
SOUTHERN CARBON COUNTY

Medicine Bow-Divide Resource Management Plan



▨ Area of Access Needs

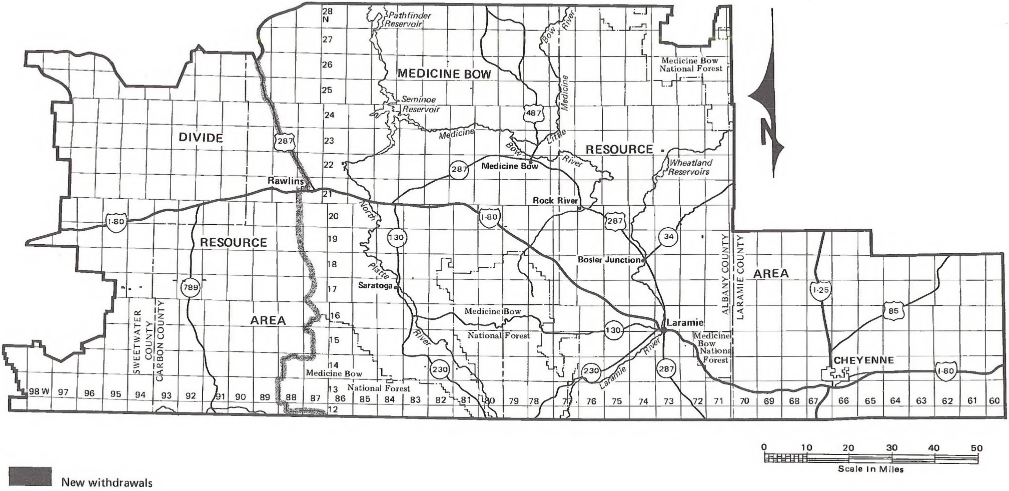
◆◆◆◆◆◆ Continental Divide Trail

1	Elk Mountain
2	Shirley Mountains
3	Miller Hill
4	Atlantic Rim
5	Rawlins Uplift
6	White Rock Canyon
7	Arlington
8	Woodedge
9	Seven Mile
10	Little Medicine
11	Toltec
12	North Laramie River
13	Pine Mountain-Split Rock
14	Sugarloaf
15	Big Creek
16	Seminoe-Pathfinder Reservoirs
17	Ferris Mountains

Map 12

AREAS OF ACCESS NEEDS

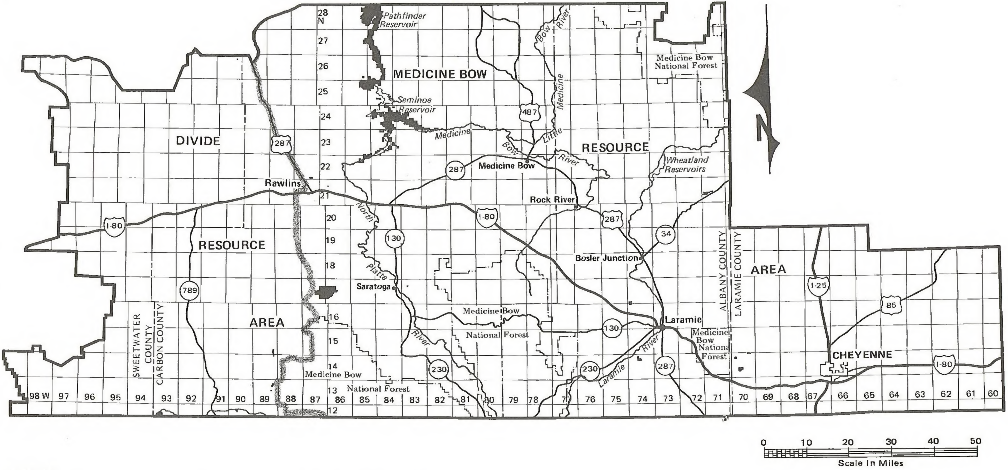
Medicine Bow-Divide Resource Management Plan



Map 13

PREFERRED ALTERNATIVE WITHDRAWALS NEW WITHDRAWALS

Medicine Bow-Divide Resource Management Plan

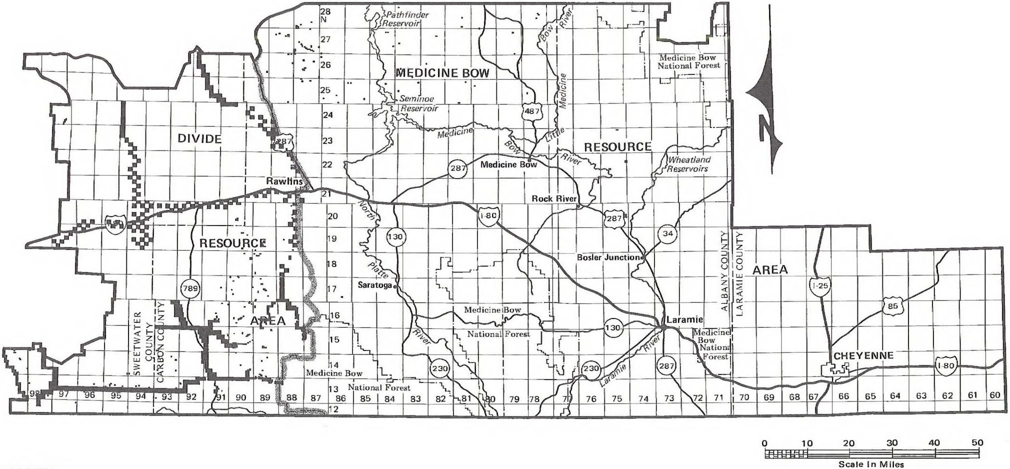


▇ Withdrawals which prohibit disposals and agriculture or mineral entry

Map 14

PREFERRED ALTERNATIVE WITHDRAWALS - WITHDRAWALS WHICH PROHIBIT DISPOSALS AND AGRICULTURAL OR MINERAL ENTRY

Medicine Bow-Divide Resource Management Plan



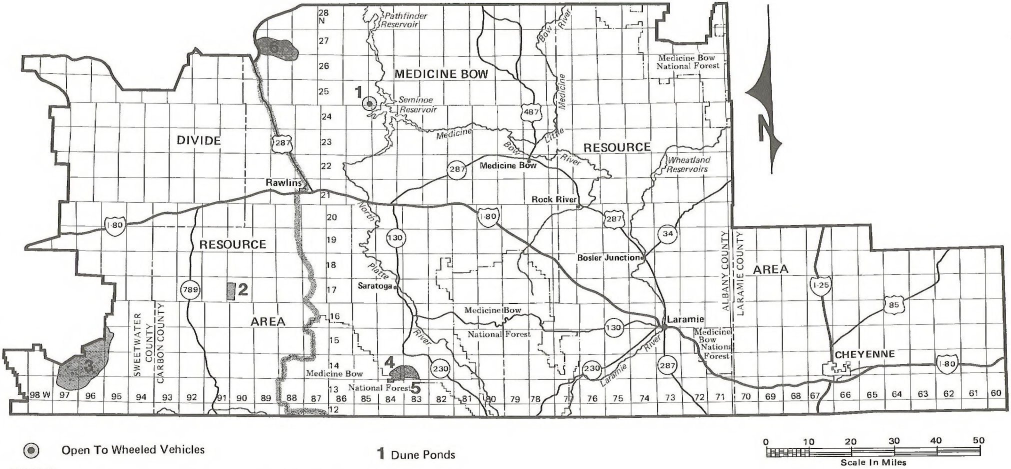
■ Withdrawals which prohibit disposals and agriculture entry

Map 15

PREFERRED ALTERNATIVE WITHDRAWALS

WITHDRAWALS WHICH PROHIBIT DISPOSALS AND AGRICULTURAL ENTRY

Medicine Bow-Divide Resource Management Plan



◉ Open To Wheeled Vehicles

▨ ORV Travel Limited to Designated Roads and Trails

▨ Closed to ORV's from Dec. 1 - April 30

■ Closed to All Vehicles Yearlong

☐ ORV Travel Limited to Existing Roads and Trails

1 Dune Ponds

2 Sand Hills

3 Adobe Town (See Adobe Town-Ferris Mtns. Wilderness EIS)

4 Encampment River Canyon (See Medicine Bow Wilderness EIS)

5 Encampment River Trail (See Medicine Bow Wilderness EIS)

6 Ferris Mountains (See Adobe Town-Ferris Mtns. Wilderness EIS)

Map 16

OFF-ROAD VEHICLE DESIGNATIONS

Medicine Bow-Divide Resource Management Plan

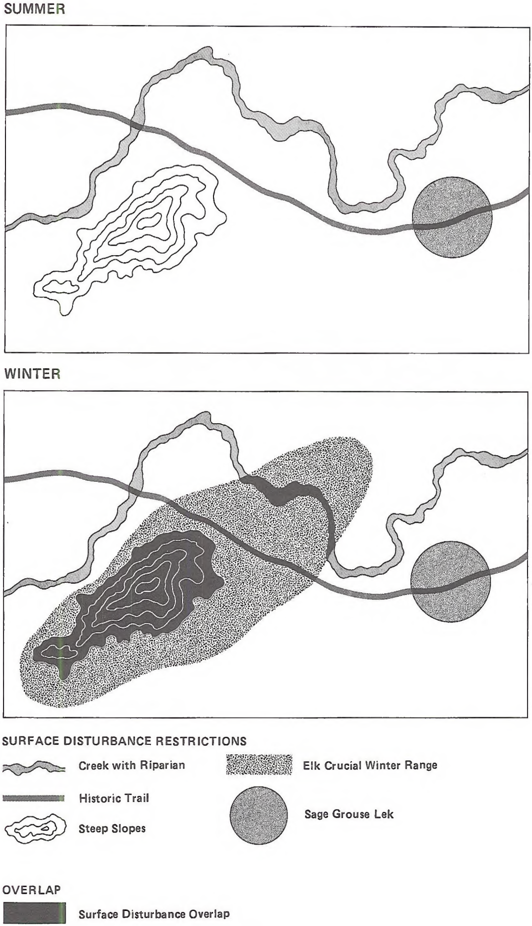


Figure 4
OVERLAPPING SURFACE DISTURBANCE RESTRICTIONS

TABLE 2

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
CULTURAL RESOURCES/ NATURAL HISTORY	New inventory data would be generated in proportion to the amount of surface disturbance.	Less new inventory data would be generated under this alternative than under Alternative A.	More new inventory data would be generated under this alternative than under Alternative A.	Increased surface disturbance would generate more new inventory data than under Alternatives A or B, but less than under C.
	A total of 903,000 acres under existing withdrawals would be protected from surface disturbance related to locatable mineral development.	Same as Alternative A, with 16,355 additional acres of new withdrawals.	Same as Alternative A, but 821,507 fewer acres would be withdrawn.	Same as Alternative A, but 819,937 fewer acres would be withdrawn.
	Surface disturbance in the Como Bluff NNL would be managed with application of standard protection requirements. This would help ensure the preservation of Como Bluff NNL.	The Como Bluff NNL would be closed to oil and gas leasing and withdrawn from mineral entry; therefore, it would be protected from surface disturbance due to mineral exploration and development.	Same as Alternative A, except Como Bluff would be designated an ACEC, which would help ensure management for its cultural resource values. Requirement for plans of operation would help ensure protection from disturbance associated with locatable mineral development. Surface disturbance would be intensively managed within 1/4 mile of the Morrison Formation. This would help to ensure the preservation of cultural, paleontological, and natural history resources in the area.	Same as Alternative C
	Application of standard protection requirements to surface-disturbing activities would help to prevent disturbance of intact segments and sites along the Overland, Cherokee, and Rawlins-Fort Washakie historic trails.	Same as Alternative A, plus trail segments would be included in new locatable mineral withdrawals.	Same as Alternative A	Same as Alternative A, plus portions of the Overland trail would be included in new mineral withdrawals.
FORESTRY	In the long term, intensive management on approximately 48% of the commercial forestland would improve the health and productivity of the forest.	In the long term, intensive management on approximately 23% of the commercial forestland would improve the health and productivity of the forest.	In the long term, intensive management on approximately 77% of the commercial forestland would improve the health and productivity of the forest.	Same as Alternative C

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
FORESTRY (continued)	The condition of the commercial forestland that would not be harvested in the next 100 years (approximately 52% of the base acreage) would continue to deteriorate with increased insect, disease, and stagnation problems.	The condition of the commercial forestland that would not be harvested in the next 100 years (approximately 77% of the base acreage) would continue to deteriorate with increased insect, disease, and stagnation problems.	The condition of the commercial forestland that would not be harvested in the next 100 years (approximately 23% of the base acreage) would continue to deteriorate with increased insect, disease, and stagnation problems.	Same as Alternative C
	There would be a loss of productivity from the "no harvesting" restriction, and this could decrease the area's sustained yield capability.	Same as Alternative A	Productivity would increase with time because of few harvesting restrictions. This would raise the area's sustained yield capability.	Same as Alternative C
	In the long term, consolidation of landownership on Elk Mountain would make possible more effective insect and disease control.	In the long term, consolidation of landownership on Elk Mountain and Shirley Mountain would make possible more effective insect and disease control.	The lack of consolidation of landownership would cause insect and disease control efforts to be less effective.	Same as Alternative B
	The annual revenue generated by harvesting would amount to about $920,000. At an average stumpage value of $20 per MBF, the timber harvested would generate $25,000 per year to the U.S. government in timber sale receipts.	The annual revenue generated by harvesting would amount to about $442,000. The timber harvested would generate $12,000 per year to the U.S. government in timber sale receipts.	The annual revenue generated by harvesting would amount to about $1,474,000. The timber harvested would generate $40,000 per year to the U.S. government in timber sale receipts.	Same as Alternative C
LANDS	The opportunity for communities to acquire public land for expansion would not be available. This could cause real estate prices to rise as population growth put pressure on a limited land base.	Same as Alternative A	The opportunity for communities to acquire public land for expansion would be available. This could make possible development of public services or private uses that otherwise might not take place.	Same as Alternative C

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
LIVESTOCK GRAZING	In the Divide and Seven Lakes grazing EIS areas, a minimal long-term loss of AUMs (less than 1%) would result from acreage disturbed and not reclaimed from lands and minerals management actions. Livestock operators might be forced to rent private pasture or feed additional hay if loss of AUMs in an allotment was great.	Same as Alternative A	Same as Alternative A	Same as alternative A
	In the Medicine Bow grazing EIS area, livestock grazing would be licensed up to the active preference level in the short term. Lack of new livestock grazing management actions would result in a reduction to 151,102 AUMs in the long term. Management actions for forestry, lands, and minerals would result in a net addition of 396 AUMs, so total long-term available forage would be 151,498 AUMs.	In the Medicine Bow grazing EIS area, available livestock forage would decrease below active preference level in the long term. Management actions for livestock grazing would reduce available forage to 147,599 AUMs. Actions for forestry, lands, minerals, and wildlife would result in a reduction of 2,490 more AUMs. Total long-term available forage would be 145,109 AUMs.	In the Medicine Bow grazing EIS area, available forage would increase above active preference level in the long term. Management actions for livestock grazing would increase available forage to 189,579 AUMs. Actions for forestry, lands, and minerals would add 1,390 AUMs. Total long-term available forage would be 190,969 AUMs.	In the Medicine Bow grazing EIS area, available livestock forage would increase above active preference level in the long term. Management actions for livestock grazing would increase available forage to 185,905 AUMs. Actions for forestry, lands, minerals, and wildlife would add 1,035 AUMs. Total long-term available forage would be 186,940 AUMs.
MINERAL RESOURCES	Sufficient coal would be available for leasing to meet existing demand, but the BLM's flexibility to respond to changes in demand would be limited because three areas with development potential would not be available.	Same as Alternative A except that only two coal areas with development potential would not be available.	Sufficient coal would be available for leasing to meet existing demand, and the BLM would have maximum flexibility to respond to changes in demand since all areas with development potential would be available.	Same as Alternative C
	Standard protection requirements might prevent efficient development of the oil and gas resources in the same area.	Stringent stipulations could make the most efficient field development impossible,	Same as Alternative A for areas outside KGSs. Inside KGSs, standard protection requirements would not	Same as Alternative A

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
MINERAL RESOURCES (continued)		causing drainage problems and loss of royalties.	restrict oil and gas development except where the commitment to mitigate wildlife losses could make it uneconomical to develop some leasable mineral areas.	
	Disposal of 2,000 acres of surface by sale or exchange could impose restrictions on the availability of leasable and locatable minerals. There is the potential for creating split estate, thus restricting mineral availability and development through conflicts over surface development and surface ownership.	A lack of land disposal would prevent new split estate problems.	Same as Alternative A except that 152,000 acres would be available for disposal, of which approximately 10,000 acres would be disposed of in 20 years.	Same as Alternative A except that 66,000 acres would be available for disposal, of which approximately 10,000 acres would be disposed of in 20 years.
	Withdrawals on 903,000 acres would prevent locatable mineral development in those areas.	Same as Alternative A except that 919,355 acres would be withdrawn and not available for locatable mineral development.	A total of 81,493 acres would be withdrawn, so more land would be available for locatable mineral development.	Same as Alternative C except that 83,063 acres would be withdrawn.
	A plan of operations would be required for locatable mineral exploration and development consistent with regulations and where disturbance of more than 5 acres occurred.	Plans of operation would be required on 158,712 acres designated as ACECs. Approval of plans of operation could cause delays in mineral prospecting, exploration, and development.	Same as Alternative B except that the ACEC acreage total would be 110,290.	Same as Alternative B except that the ACEC acreage total would be 37,560.
RECREATION	Landownership consolidation could enhance recreation opportunities including hunting and fishing.	Same as Alternative A except that more areas would be considered for landownership consolidation, increasing opportunities for fishing and hunting.	Landownership would not be consolidated, so there would be no increase in opportunities for hunting and fishing.	Same as Alternative A except that more areas would be considered for landownership consolidation, increasing opportunities for fishing and hunting.
	Improvements to 43.5 miles of aquatic habitat would enhance fishing opportunities.	Improvements to 85 miles of aquatic habitat would enhance fishing opportunities.	Same as Alternative A	Same as Alternative B

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
RECREATION (continued)	Coal development would have virtually no effect on opportunities for hunting.	Same as Alternative A	If coal development occurred in the Atlantic Rim area, there could be losses in elk and deer populations. This would cause a decline in hunting opportunities and poorer quality hunting. The magnitude of the effect would depend on the exact location and the method of mining.	Same as Alternative C
	Oil and gas activities in the planning area could affect big game populations and cause a decline in the quality of hunting in the area. Existing recreation sites would be protected from oil and gas development; therefore, visitation would not decline.	Same as Alternative A except that both existing *and* proposed recreation sites would be protected from oil and gas development.	Same as Alternative A except that both existing *and* proposed recreation sites would be protected from oil and gas development.	Same as Alternative A except that both existing *and* proposed recreation sites would be protected from oil and gas development.
	Recreation opportunities could be reduced if locatable minerals were developed near the Encampment River and Big Creek recreation sites or along important stretches of the North Platte River. Withdrawals on existing recreation sites would prevent degradation of recreation opportunities.	Locatable mineral withdrawals would prevent degradation of recreation opportunities on existing and proposed recreation sites and important stretches of the North Platte River.	Same as Alternative A	Same as Alternative B except that land adjacent to the North Platte River would not be withdrawn from locatable mineral entry. If locatable minerals were developed in that area, it could become unavailable for recreation and the quality of fishing could decline.
	ORV designations would provide recreation opportunities without restricting users or damaging resources. Fishermen using the Dune Ponds open area could experience a continued loss of solitude.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	ORV use in the Sand Hills area would be allowed on existing roads and trails. This would maximize recreational ORV	In the Sand Hills Management Area, ORV use would be limited to	Same as Alternative B	Same as Alternative A except that there would be rehabilitation or

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
RECREATION (continued)	use in that area.	designated roads and trails, causing hunters to walk into areas where formerly they could drive.		mitigation in specific problem areas.
SOILS, WATER, AND AIR	In the short term, intensive forest management on 17,012 acres would cause some acceleration of erosion and local degradation of air and water quality. In the long term, the health and vigor of the forest would improve, reducing erosion and improving water quality.	Same as Alternative A except that 15,622 acres would be harvested.	Same as Alternative A except that 19,159 acres would be harvested.	Same as Alternative A except that 19,159 acres would be harvested.
	Allotments with a downward trend would continue in a downward trend. In the long term, vegetative cover would be reduced as condition declined, causing increased rates of erosion. An increase in accelerated erosion would degrade water quality by increasing salt and sediment loading.	Allotments in a downward trend would be improved. Vegetative cover would increase as condition improved, leading to decreased rates of erosion. A reduction in accelerated erosion would enhance water quality by reducing salt and sediment loading. Planned range improvements could reduce soil erosion and enhance water quality by controlling stream flows, making them less erosive, and protecting stream side vegetation.	Development of new AMPs on "I" allotments and addition of range improvements would prevent accelerated erosion and degradation of water quality on "I" allotments. Planned range improvements could reduce soil erosion and enhance water quality by controlling stream flows, making them less erosive, and protecting streamside vegetation.	Same as Alternative C
	In the long term, continued livestock grazing in riparian areas would make stream banks more susceptible to erosion as vegetation condition declined.	In the long term, the condition of 1,781 acres of riparian vegetation would improve. Vegetative cover would increase and lead to decreased rates of erosion, which would	Same as Alternative B except that the condition of 1,725 acres of riparian vegetation would improve.	Same as Alternative B

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
SOILS, WATER, AND AIR (continued)		enhance water quality by reducing salt and sediment loading.		
	Areas open to oil and gas exploration and development activities under standard protection requirements would have minimally increased rates of soil erosion and degradation of water and air quality.	Same as Alternative A except that a total of 37,560 acres would be closed to oil and gas leasing. This would help protect and maintain soils, water, and air quality. Restrictions along intermittent and ephemeral streams would enhance protection of soil and water quality.	Same as Alternative A for areas outside KGSs. Within KGSs, standard protection requirements could lead to increased soil erosion and degradation of water and air quality. This would be tempered by management actions in critical watersheds.	Same as Alternative A
	Withdrawal of 903,000 acres from locatable mineral activities would prevent potential accelerated erosion and degradation of water and air quality.	Same as Alternative A except that 919,355 acres would be withdrawn.	Same as Alternative A except that except 81,493 acres would be withdrawn.	Same as Alternative A except that 83,063 acres would be withdrawn.
	There would be no ACEC designations.	Plans of operations would be required on a total of 158,712 acres in ACECs. This would help ensure protection and maintenance of the quality of soils, water, and air.	Same as Alternative B except that 110,290 acres would be designated as ACECs.	Same as Alternative B except that 37,560 acres would be designated as ACECs.
	Management actions in designated critical watersheds would minimize soil erosion and degradation of water resources.	Same as Alternative A	Same as Alternative A	Same as Alternative A
	Management actions for wildlife to protect riparian areas, improve vegetative cover, and reduce surface disturbance on 783,850 acres would restrict surface disturbance and reduce the potential for soil erosion.	Same as Alternative A except that 864,975 acres would be involved.	Same as Alternative A except that 1,003,545 acres would be involved.	Same as Alternative A except that 864,975 acres would be involved.

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
VEGETATION	In the long term, ecological range condition and trend of vegetation communities would decline by 7% in the grazing EIS area.	Implementation of 55 AMPs and construction of projects would lead to increased plant vigor and storage of carbohydrate reserves. This would improve ecological condition and vegetation trend. The improvement over the grazing EIS area as a whole would be 8.5%.	Same as Alternative B except that improvement over the grazing EIS area would be 4.7%.	Same as Alternative B except that improvement over the grazing EIS area would be 5.2%.
	The condition of riparian vegetation would be maintained or would decline.	In the long term, the condition of 1,781 acres of riparian vegetation would improve.	In the long term, the condition of 1,725 acres of riparian vegetation would improve.	Same as Alternative B
	Adverse effects on rare plants would not be expected.	Same as Alternative A	Same as Alternative A	Same as Alternative A
VISUAL RESOURCES	Visual quality on 194,000 acres of VRM Class I and II areas would be preserved.	Same as Alternative A	Visual quality on 183,000 acres of VRM Class I and II areas would be preserved. Visual quality could be degraded on 11,000 acres of VRM Class I areas inside KGSs.	Same as Alternative A
WILDLIFE AND FISHERIES	Intensive forest management on 48% of the commercial forestland would adversely affect big game in the short term through habitat disturbance and displacement. In the long term, habitat would be improved through increased age class and habitat diversity. The habitat value of the remainder of the forest would decline in the long term.	Same as Alternative A except that 23% of the commercial forestland would be under intensive forest management.	Same as Alternative A except that 77% of the commercial forestland would be under intensive forest management.	Same as Alternative C
	Continued overuse of high priority habitat types by grazing animals would result in a long-term habitat loss and reduced grazing capacities.	Management actions for livestock grazing would improve the vegetative community so that it would support a larger and more diverse wildlife community.	Same as Alternative B, but the improvement in vegetation would be somewhat less.	Management actions for livestock grazing would improve the vegetative community so that it would support a larger and more diverse wildlife community. The

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
WILDLIFE AND FISHERIES (continued)				improvement would be less than in Alternative B but more than in Alternative C.
	Riparian habitat would be enhanced along 43.5 miles of trout stream.	Same as Alternative A except that 85 miles of trout stream habitat would be enhanced.	Same as Alternative A	Same as Alternative A except that 85 miles of trout stream habitat would be enhanced.
	Coal would be considered for leasing in Wild Horse Draw, Red Rim, China Butte, Hanna Basin, and Indian Springs. Coal development would adversely affect wildlife, primarily through increased disturbance from the presence of humans. Direct physical habitat loss would be minimal and would be reclaimed in the long term.	Same as Alternative A except that North Indian Springs would also be considered for leasing. This could reduce raptor productivity in the Shamrock Hills raptor concentration area in the long term.	Same as Alternative B except that Atlantic Rim and Northeast Cow Creek would also be considered for leasing. If development were to occur on Atlantic Rim, there could be a loss of crucial winter range for elk.	Same as Alternative C
	Seasonal restrictions on oil and gas exploration and development during critical periods and restrictions on surface disturbance would help reduce mortality, ensure reproductive success and survival of young, and reduce conflict with owners of adjacent property that could be caused by displaced animals.	Same as Alternative A	Same as Alternative A except that there would be a potential for greater habitat loss inside KGS areas because of reduced restrictions.	Same as Alternative A
	If uranium mining should occur, surface disturbance would cause a loss in the Baggs elk crucial winter range. Increased human activity could create avoidance zones. If uranium mining should occur, surface disturbance in the Red Desert area would cause a loss in summer or winter/yearlong range for antelope and a loss of sage grouse breeding/nesting habitat in the long term.	Same as Alternative A	Same as Alternative A except that if uranium mining should occur in the Poison Basin area, surface disturbance and human activity could cause a loss of mule deer crucial winter range.	Same as Alternative A except that if uranium mining should occur in the Poison Basin area, surface disturbance and human activity could cause a loss of mule deer crucial winter range.
	Restrictions on ORVs would limit stress and disturbance of big game and nesting	Same as Alternative A except in the Sand Hills	Same as Alternative B	Same as Alternative A

TABLE 2 (Continued)

COMPARATIVE SUMMARY OF CUMULATIVE IMPACTS

	Alternative A	Alternative B	Alternative C	Alternative D (preferred)
WILDLIFE AND FISHERIES (continued)	raptors. In the long term, restriction of ORVs to existing roads and trails would be of limited value to wildlife because new roads that became established through permitted activities would then become available for ORV use.	area, where ORV use would be restricted to designated roads and trails. Stress and disturbance during the critical winter period would be reduced. Physical habitat loss would be stopped, and avoidance zones would be nullified.		
	Nesting habitat for raptors would be protected during the nesting period but could be lost during the nonrestricted period.	The loss or degradation of high value habitat for game and nongame species would be reduced with special emphasis on maintenance and improvement of habitat. Raptor concentration areas designated as ACECs would receive additional management attention. These actions would maintain habitat integrity and reduce stress, disturbance, and displacement so that raptor reproduction could be maintained.	Same as Alternative A except that habitat losses and disturbance would be mitigated within KGS areas. Outside KGS areas, habitat losses and disturbance would be similar to those under Alternative A.	Same as Alternative B

ABBREVIATIONS: ACEC = area of critical environmental concern; AUM = anumal unit month; KGS = known geologic structure; MBF = thousand board feet, NNL = national natural landmark; ORV = off-road vehicle.

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Chapter Three

Affected Environment

CHAPTER 3

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter describes environmental components that influence the resolution of planning issues or that would be affected by the management actions presented in chapter 2. Environmental components that would not be affected or that are not important to resolution of planning issues are not covered in detail.

More detailed information about the affected environment is contained in the management situation analysis (MSA) for the Medicine Bow-Divide planning area. The MSA is available for review at the Rawlins District office.

The affected environment for the Bennett Mountains WSA, the Prospect Mountain WSA, and the Encampment River Canyon WSA is described in the wilderness supplement to this document (USDI, BLM forthcoming). The affected environment for the Adobe Town WSA and the Ferris Mountains WSA is described in the Adobe Town-Ferris Mountains Wilderness EIS (USDI, BLM 1984b).

CULTURAL AND NATURAL HISTORY RESOURCES

Cultural Resources

Introduction

A total of 5,711 cultural resource properties have been recorded in the planning area, primarily through data that have been generated over the past ten years in response to proposals considered through the BLM's lands and minerals programs. As of April 1986, approximately 5.5% (346.3 square miles) of the public lands in the planning area had been inventoried at the Class III level of intensity (see Glossary). A Class II (sample) inventory of a portion of the planning area known as the Overland Planning Unit, completed in 1979, accounts for approximately 11% of the inventoried acreage. A few properties have been more thoroughly investigated as the subjects of research and data recovery efforts carried out in recent years.

Cultural resources in the planning area represent human occupation throughout two broad overlapping periods: the prehistoric and historic periods.

Prehistoric Period

The prehistoric period began with the first human occupation of the planning area some 12,000 years ago and lasted into the late 1700s or early 1800s. The period, which is defined by the absence of written records, predates extensive contact between Native Americans and Euro-Americans. It is characterized by a relatively stable way of life that saw few major adaptational changes over time.

Inventory data available as of April 1986 indicate that 4,980 cultural resource properties in the planning area date to the prehistoric period. Of these, 4 are listed on or have been determined to be eligible for listing on the National Register of Historic Places by the keeper of the National Register. In conjunction with the Wyoming State Historic Preservation Office (SHPO), the BLM has found that 1,753 properties meet National Register criteria and 1,998 do not. The eligibility of 893 properties is uncertain, and information pertaining to the eligibility of 332 additional properties is not available.

Prehistoric period cultural resource properties in this area generally are characterized by lithic scatters, stone circle features, petroglyphs and pictographs, game drive lines, hearths and firepits, lithic material quarries, and rockshelter habitation sites. House pits have been discovered in the planning area recently. Prehistoric period properties generally contain nonperishable artifacts and other remains, including stone tools, pottery, bone, and charcoal. These properties are important predominantly for the information that can be recovered from them, although properties that include petroglyphs or pictographs may be considered important for their stylistic or artistic qualities.

Interpretation of prehistoric cultural resources found in the planning area indicates that the Native Americans were nomadic hunters and gatherers who lived in small bands. Their movements were determined to a large degree by seasonal changes in the availability of resources. Recently discovered evidence of house pits indicates that at least some locations were used for more extended periods of time, probably during inclement seasons.

Historic Period

Background

The transformation of the prehistoric period into the historic period is marked by increasing contact between Native Americans and Euro-Americans, which began in the late 1700s. Important changes in Native American peoples and cultures during a relatively short time resulted from the introduction of European and Asian objects and ideas and from contact between Native Americans and Euro-Americans.

The historic period generally is considered to have begun with the arrival of well-organized fur trading expeditions into the region in the early 1800s. It is characterized by the major themes in the history of the American West—early Rocky Mountain fur trading; early military explorations; transcontinental emigration; Indian wars; gold, silver, and copper mining; open-range livestock grazing; transcontinental railroading; and energy exploration.

Inventory data available as of April 1986 indicate that 731 cultural resource properties in the planning area date to the historic period. Of these, 21 are listed on or have been determined to be eligible for listing on the National Register of Historic Places by the keeper of the National Register. In conjunction with the Wyoming SHPO, the BLM has found that 84 properties meet the National Register criteria and 265 properties do not. The eligibility of 318 properties is uncertain, and information pertaining to the eligibility of 43 additional historic properties is not available.Cultural resources in the planning area that date from the historic period include mining operations and settlements, stage trails and stations, emigrant trails, ranch developments, railroad installations, and oil and gas facilities. Properties less than 50 years old generally are not considered to be historic cultural resources.

Cultural resource properties that could be affected by management actions addressed in this plan are limited to three historic trails and the sites associated with these trails. Como Bluff, a National Register property that also would be affected, is described in the section on affected natural history resources.

Overland Trail Special Management Areas

Explorers in the 1850s found the route that was to become the Overland Trail (see map 17) in an effort to identify a route shorter than the Oregon Trail between Fort Bridger and the Laramie Range. Construction along the trail (removal of obstacles and grading of stream banks) began in 1856. The trail played an important role in Western migration and stage travel.

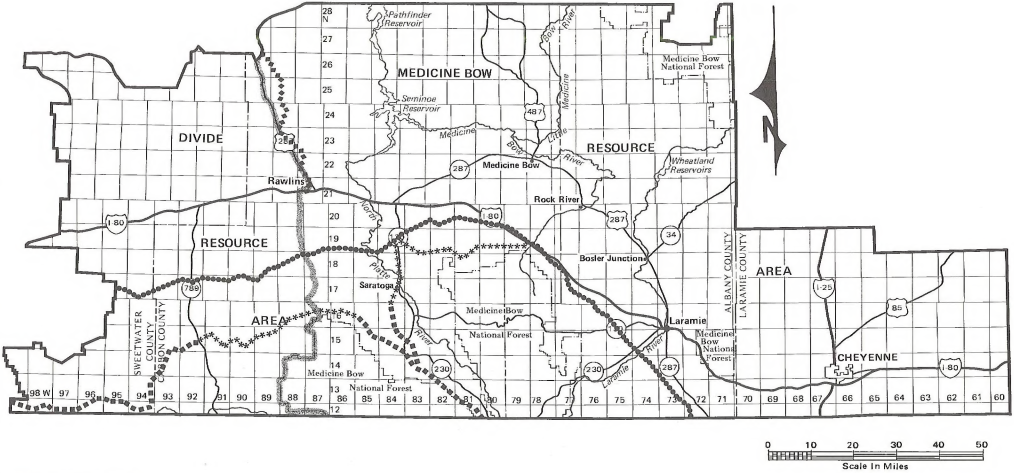
The BLM and the Wyoming SHPO have determined that six segments of the Overland Trail that remain relatively intact meet the eligibility criteria for the National Register. The segments are characterized by visible wheel ruts that measure less than 1.7 meters apart and are presumed to have been made by horse-drawn wagons. The general locations of the segments are shown on the Historic Trail folded map.

The Washakie Stage Station was listed on the National Register of Historic Places in 1978 (see the Historic Trail folded map). It is one of the few remaining stage stations along the Overland Trail at which there are standing ruins. The Washakie Stage Station consisted of a main building to which a corral and shed were attached. The native sandstone walls of the main building, which were constructed in 1862, still stand. A foundation or footing for the shed also can be discerned. Approximately 200 acres surrounding the stage station contain other sites that may yield evidence of Native American/Euro-American contact during the 1860s. Burials from the same period also are found at this location.

Cherokee Trail

When news of the 1848 gold strike in California reached Oklahoma, several groups of the Cherokee left for California. The first known party to cross southern Wyoming on the way to California in 1849 pioneered the Cherokee Trail. At least five other parties used the trail by 1850.

Beginning in the 1840s, the northern branch of the Cherokee Trail provided access to otherwise inaccessible areas. Segments of the northern branch of the trail became the Overland Trail of the 1860s. Before the Denver and Rio Grande



●●●●●●●● Overland Trail

■■■■■■ Cherokee Trail

******* Nondefined Cherokee Trail

◆◆◆◆◆◆◆ Rawlins—Ft. Washakie Stage Road

Map 17
APPROXIMATE ROUTES OF HISTORIC TRAILS
Medicine Bow-Divide Resource Management Plan

Railroad reached Steamboat Springs, Colorado, segments of the southern branch of the trail near Baggs, Wyoming, became freight routes serving all of northwestern Colorado and southwestern Wyoming. As a result of its evolution from a migrant trail to a multipurpose transportation road, the Cherokee Trail became the lifeline of a vast rural area and led to its development and settlement.

Within the planning area, the Cherokee Trail apparently followed three main routes (see the Historic Trail folded map). To date, only isolated segments of the trail have been inventoried. Delineation of the remainder of the trail routes and the implementation of protection measures will be undertaken as funding permits. The BLM and the Wyoming SHPO have determined that the Cherokee Trail meets the National Register criteria for eligibility.

Rawlins to Fort Washakie Stage Road

The Rawlins to Fort Washakie Stage Road was first established in 1878 (see the Historic Trail folded map). This stage road opened a corridor from south central to northwestern Wyoming. It served military, commercial, and public interests until 1906, when the northwestern railway line from Casper to Lander was constructed. Freight commerce along the trail declined after 1906, but the stage road was still used by private vehicles as a transportation route from Rawlins to Lander. The route of the stage road became a regional communications route in the 1880s, when telegraph lines were constructed linking Rawlins, Fort Washakie, and Lander.

The present condition of the Rawlins to Fort Washakie Stage Road varies from location to location. As with the Cherokee Trail, intact segments have yet to be completely inventoried. The BLM and the Wyoming SHPO have determined that the trail meets the National Register criteria for eligibility.

Natural History Resources

National Natural Landmarks

National natural landmarks (NNLs) are areas that have excellent examples of ecological or geological features that are characteristic of a particular natural region (in this case, the Great Plains) and are considered nationally significant. The National Park Service studies areas proposed as NNLs and recommends those that qualify for nomination to the Secretary of the Interior. If the Secretary of the Interior agrees with the recommendations of the National Park Service, the site is designated an NNL. Three areas in the planning area have been designated as NNLs and a fourth is in the nomination process. In addition, three proposed NNLs await further study and evaluation by the National Park Service and may subsequently be recommended for nomination. Specific attributes of each NNL and proposed NNL are described below.

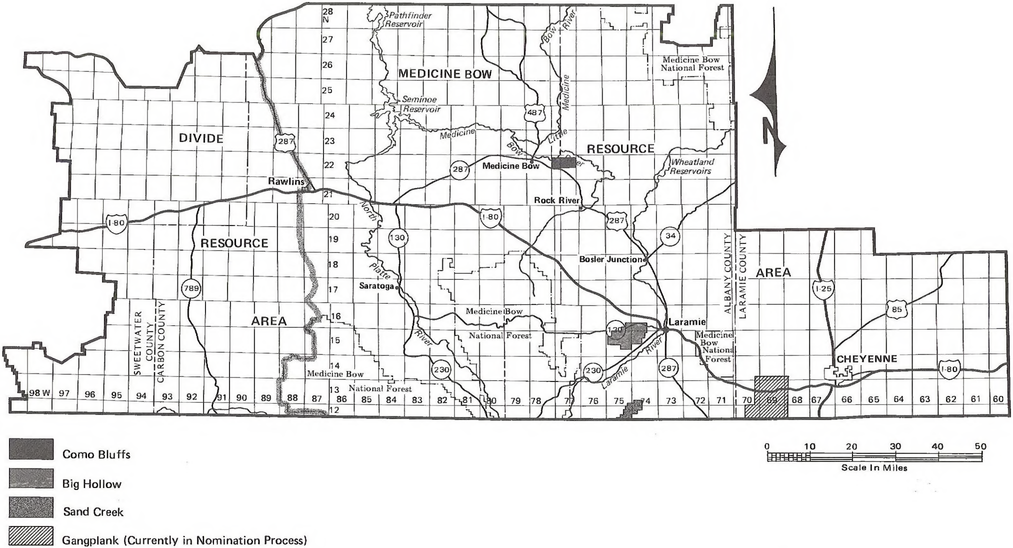
Como Bluff National Natural Landmark

Como Bluff is a westward-plunging anticline in Carbon and Albany counties approximately 5 miles east of Medicine Bow (see map 18 and NNL folded map). Formations dating from the Cretaceous through the Triassic periods are exposed in the face of the bluff. The highly fossiliferous, Jurassic-aged Morrison Formation, which has yielded significant paleontological resources since the 1870s, is included in this exposure. The importance of Como Bluff lies in the paleontological values demonstrated to occur in this area, and the historical value associated with the role that Como Bluff played in the development of paleontology as a scientific discipline.

Como Bluff was designated an NNL in 1973. Nominated as an example of the Mesozoic vertebrate paleontological sites theme, Como Bluff has yielded fossil evidence for at least 80 new vertebrate species, including a new genus of Mesozoic mammals. Fossil evidence collected at Como Bluff was well preserved, and many dinosaurian specimens are now displayed at well-known museums, including the Peabody Museum at Yale University, the American Museum of Natural History, and the National Museum in Washington.

Como Bluff also was nominated to the National Register of Historic Places in 1973 for the important role that it played in the development of paleontology as a scientific discipline. The Peabody Museum at Yale sponsored expeditions to Como Bluff for ten years beginning in the 1870s. Expeditions to Como Bluff have since been sponsored by the American Museum of Natural History and the University of Wyoming. The magnitude of the discoveries at Como Bluff brought many well-known institutions to the West in search of similar finds.

The boundaries of both the Como Bluff NNL and the National Register district encompass 7,680 acres of land, of which the BLM administers 1,760 acres. There is no legal access to the public lands within Como Bluff.



Note: Boundaries are illustrated precisely on the National Natural Landmarks folded map.

Map 18
GENERAL LOCATIONS OF NATIONAL NATURAL LANDMARKS
Medicine Bow-Divide Resource Management Plan

Big Hollow National Natural Landmark

Big Hollow, which was designated an NNL in 1980, is characterized by a large depression or deflation basin formed by wind erosion. This NNL on the high plains west of Laramie encompasses 24,960 acres (see map 18 and NNL folded map). Of this, the BLM manages 640 acres in one section, to which legal access does not exist.

The significance of the Big Hollow NNL lies in the great size of the deflation basin and the aeolian processes through which it formed. The deflation basin is considered the largest topographic feature of its kind in the continental United States.

Land in Big Hollow is used primarily for livestock grazing, but an irrigation canal, an oil field, and a lumber mill are also within the NNL boundaries. Although the integrity of the surface of those portions of the deflation basin that have not been disturbed enhances the naturalness of the landmark, the significance of Big Hollow, as defined above, is not incumbent upon this.

Sand Creek National Natural Landmark

Sand Creek area was designated an NNL in 1984, primarily for its scenic values and for the scientific values of its geologic features. The NNL, which is about 20 miles southwest of Laramie, encompasses 4,800 acres in the planning area (see map 18 and NNL folded map). Of this, the BLM administers a 160-acre parcel of public land to which legal access does not exist. Land use within this area is predominantly livestock grazing.

The geologic features at Sand Creek include pillars and monuments of cross-bedded sandstone. Chimney (Camel) Rock is more than 200 feet high. To the west of these features, a sandstone escarpment rises as much as 300 feet above the surrounding terrain. The red and white coloring of the wind- and water-sculpted features adds to the scenic beauty of this natural landmark.

The Sand Creek NNL also contains scientific values. The features described above have been the subject of geologic studies related to the processes responsible for their formation and the depositional history of the area. In addition, late Pleistocene and more recent vertebrate fossil deposits recovered within a feature known as the "Animal Trap" included a large extinct lion, an eagle-like vulture, a marten, and other species no longer found in this area.

The Gangplank (Proposed NNL)

The proposed Gangplank NNL, now in the nomination process, is in southeastern Wyoming and northeastern Colorado (see map 18 and NNL folded map). As now configured, the Gangplank encompasses 80,640 acres, within which the BLM administers four 40-acre parcels of public land. Legal access is available to only one of the four parcels. Land use is predominantly livestock grazing.

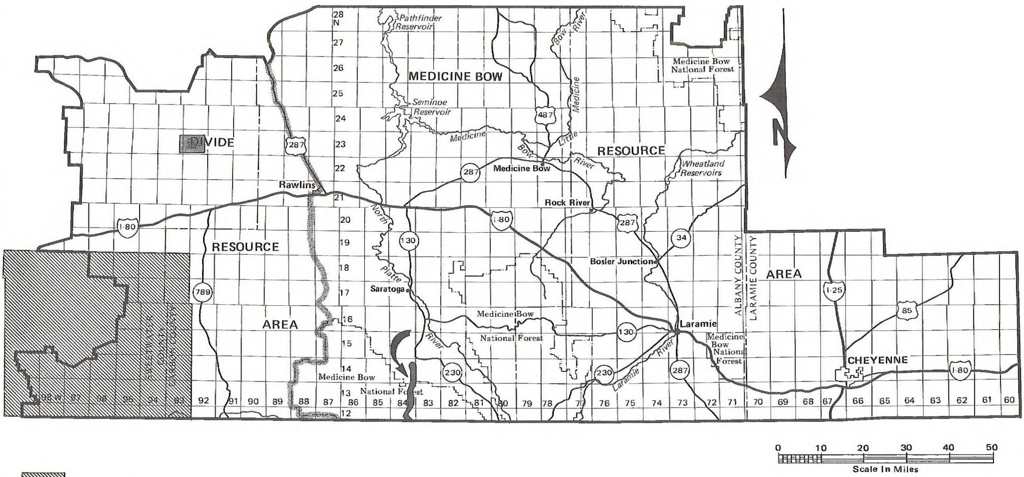
The significance of the Gangplank lies in the fact that it is a unique geologic locality in which a reflect Pliocene-aged formation is preserved as a ramp-like surface that merges with the erosional surface that truncates the core of the Rocky Mountains. In contrast, erosion during the Quaternary period deeply excavated these Tertiary-aged deposits, creating piedmont lowlands in areas beyond the Gangplank. Along the margins of the Gangplank, an excellent record of Rocky Mountain geologic history is preserved in exposures of formations dating to all major geologic eras since the Precambrian.

Washakie Basin (Proposed NNL)

The Washakie Basin is a large physiographic feature measuring approximately 525 square miles in the southeastern corner of Sweetwater County and the southwestern corner of Carbon county (see map 19). An on-site study and evaluation of this proposed NNL has yet to be undertaken by the National Park Service. Consequently, the boundaries of this area are not firmly established. The BLM administers most of the land in the southern portion and nearly half the land in the northern portion of the proposed landmark.

Preliminary studies of the Washakie Basin characterize it as an intermontane desert basin rich in both natural and cultural resources. A rugged and colorful landscape dominated by badlands, buttes, and rims imparts a scenic quality to the area. Intrusions associated with mineral exploration and development occur within many portions of the basin, a large part of which overlies the Washakie Basin Field KGS. Nevertheless, lands such as those in the portion of the Washakie Basin known as Adobe Town are undisturbed and of high scenic quality.

The Washakie Basin contains important paleontological resources. Fossils are relatively abundant in the basin, and many institutions have actively studied the geology and paleontology of the area.



▨ Washakie Basin

▒ Chain-of-Lakes

■ Encampment River

Note: Boundaries are tentative and may be refined after further study by the National Park Service.

Map 19

GENERAL LOCATIONS OF PROPOSED NATIONAL NATURAL LANDMARKS

Medicine Bow-Divide Resource Management Plan

Chain-of-Lakes (Proposed NNL)

Chain-of-Lakes consists of a series of alkaline ponds located in northeastern Sweetwater County (see map 19). In its present configuration, the proposed NNL encompasses 24 square miles, of which the BLM administers half. However, an on-site study and evaluation has yet to be undertaken by the National Park Service; consequently, the boundaries of this area are not firmly established. Land use is dominated by livestock grazing, and the area also is winter range for deer and elk.

Chain-of-Lakes is a candidate for designation as an NNL as an example of the alkaline depression-alkaline ponds natural history theme. The ponds are within marshlands surrounded by a greasewood vegetative community composed of diverse plant species. These lands are in direct contrast to the semiarid sagebrush-grasslands that characterize the surrounding area.

Encampment River (Proposed NNL)

Within the planning area, the Encampment River flows through south central Carbon County (see map 19). The proposed NNL encompasses approximately 30,000 acres, of which approximately 1,980 are public lands administered by the BLM. The proposed designation essentially involves a 1-mile wide swath centered on the river. However, an on-site study and evaluation has yet to be undertaken by the National Park Service. Consequently, the boundaries of this area are not firmly established. Land use in the area is focused on livestock grazing and recreational activities. Wildlife include bighorn sheep and other big game species. A portion of the proposed NNL is being studied for possible wilderness designation (see the wilderness supplement to this document (USDI, BLM forthcoming).

Encampment River proposed NNL is a candidate for NNL designation as an example of an undeveloped mountain stream. The river heads above the timberline on the Continental Divide in Colorado and subsequently flows unchecked through subalpine and montane forests and through submontane and semi-desert shrublands. The river courses through a deep box canyon on public lands in Wyoming before completing its descent into semi-desert shrublands just south of Encampment.

Paleontological Resources

The planning area contains some of the richest paleontological resources in the United States. McGrew and Bown mentioned two of these in "Fossil Vertebrate Faunas" (1977), in which they said "Como Bluff is perhaps the most important Late Jurassic dinosaur site in the world and is, without question, the most important fossil mammal site of that antiquity." They also said, "the Fort Union Formation Swain Quarry is potentially, if not actually, the richest paleocene mammal locality in the world."

This area of Wyoming has been the subject of paleontological research since 1856. More than 30 museums and universities have frequented the area in search of vertebrate fossils. Fossils recovered from the planning area can be found in private and public collections all over the world.

The planning area is an important paleontological research area in large measure because of its high elevation and continental climate, which hinder vegetation growth and soil development and support erosion and bedrock exposure. Most fossils are recovered as scattered surface finds in areas of exposed rocks. Paleontologists often rely on chance for discoveries. Exposures that produce significant fossils, particularly vertebrates, are rare, and consequently the fossils are of considerable scientific value and of interest wherever they are found. Some sites in the planning area have yielded the only fossil record of several extinct animals.

Fossil deposits, a valuable and nonreplenishable asset, are subject to damage from surface disturbance associated with construction or maintenance of various projects and to damage or removal by amateur collectors and "rock hounds." Although some of these enthusiasts are aware of the scientific value of their finds, many are not.

Important and unique specimens in private collections and rock shops often are unavailable for inspection and study by qualified scientists. Moreover, the scientific value of a fossil specimen can be diminished by improper curation or by failure to record precise locality and stratigraphic data in the field. Specimens can be damaged by improper collecting techniques by inexperienced collectors. Damage to or destruction of paleontological resources results in a permanent loss of those resources for future investigations or public enjoyment.

FOREST RESOURCES

The planning area contains 111,403 acres of forestland. The most commercially important tree species is lodgepole pine. Other commercial species present are Engelmann spruce, subalpine fir, ponderosa pine, and Douglas-fir. Species that have little commercial value but are important when other resource values are considered are quaking aspen, limber pine, and Rocky Mountain juniper.

Various ecological factors, particularly climate, determine where these different trees occur in the planning area. The general conditions that favor natural tree establishment are representative of central Rocky Mountain forests. Table 3 shows the acreage of forestland by the major components.

TABLE 3

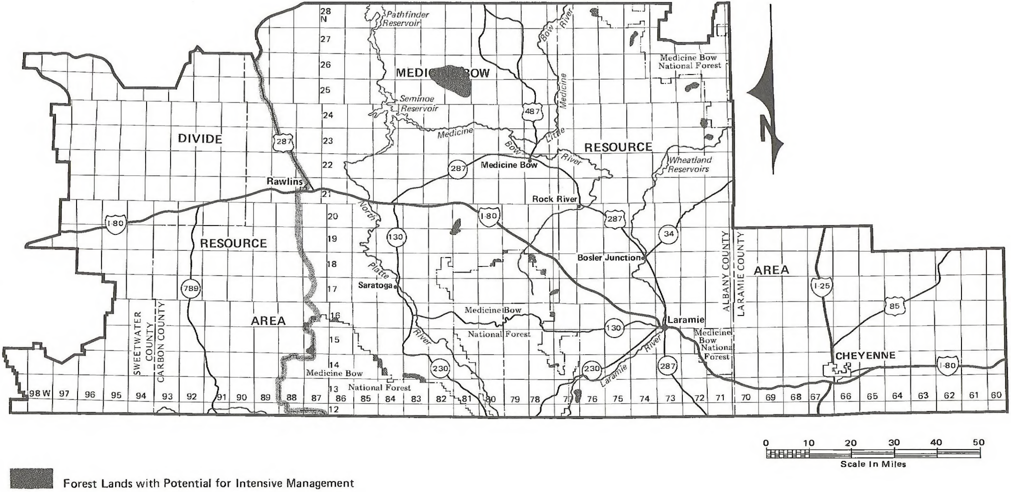
FORESTLAND COMPONENTS

Species or Type	Acreage	Percentage of Commercial Forestland	Percentage of Total Forestland
Commercial forestland			
Lodgepole pine	19,361	74	17
Subalpine fir-Englemann spruce	3,555	14	3
Ponderosa pine	2,649	10	2
Douglas-fir	610	2	less than 1
Subtotal	**26,175**		
Noncommercial forestland			
Ponderosa pine-Limber pine	32,120		29
Juniper	26,108		24
Aspen	18,315		16
Mixed conifer (no predominant timber type)	8,235		7
Douglas-fir	450		less than 1
Subtotal	**85,228**		
Total	**111,403**		

Commercial forestland is land that is capable of producing at least 20 cubic feet of growth per acre per year of a tree species suitable for commercial wood products. Commercial forestland is in both accessible and inaccessible areas and in areas that currently may be economically inoperable because of factors such as steep slopes. Noncommercial forestland is land that has low growth potential or is capable of growing only noncommercial tree species.

Of the 111,403 acres of forestland in the planning area, approximately 26,175 acres (23%) is commercial forestland (see map 20 for locations). The remaining 85,228 acres of forestland (77%) is noncommercial.

An intensive inventory of the commercial forestland was completed in 1981 (see the Forestry appendix for more information). From an analysis of this inventory, the following deter-



Map 20

FOREST LANDS WITH THE POTENTIAL FOR INTENSIVE MANAGEMENT

Medicine Bow-Divide Resource Management Plan

minations can be made about the commercial forestland:

> A large percentage of the lodgepole pine is in the mature and overmature age classes (see table 4).

TABLE 4

PRESENT AGE CLASS DISTRIBUTION OF LODGEPOLE PINE IN THE PLANNING AREA

Age Class	Percentages of Total Lodgepole Pine	Ideal Distribution
0 to 10	6	10
10 to 40	15	30
40 to 70	14	30
70 plus	65	30

NOTE: More information on the importance of age class distribution is available in the Forestry appendix.

> Mountain pine beetle and dwarf mistletoe disease are very serious threats to the future health of the lodgepole pine. Mortality from mountain pine beetles alone could amount to more than half a million trees within the next 10 to 15 years.
>
> In addition to the above two problems, much of the commercial forestland has either too many or too few trees per acre. Overstocking (too many trees) results in too much competition among trees for light, water, and nutrients; and understocking (too few trees) results in underutilized sites. Either situation causes a drop in productivity, but forest management activities can be geared to lessen or eliminate these problems. Approximately 51% of the commercial forestland in the planning area is understocked and about 36% is overstocked.

A forest management program has been active in the planning area since the mid-1970s. Approximately 1,200 acres of lodgepole pine have been harvested since 1978. About 420 acres of young lodgepole pine have been precommercially thinned. An additional 150 acres also would require this treatment over the next 15 years to maintain their productivity.

About 500 acres of lodgepole pine are not producing commercial quality wood because of too many trees per acre, low tree crown ratios, advanced age, and the high prevalence of disease. Thinning would not create a measurable growth response because of the above factors. An opportunity to make these areas productive is available through stand eradication projects and establishment of new stands.

The major wood product users in the planning area are sawmills. The larger mills are in Laramie, Saratoga, and Encampment. The demand from these sawmills can vary from 30 to 40 million board feet (MMBF) per year, depending on market conditions. Most of this demand is met from the neighboring Medicine Bow National Forest, which recently established an annual harvest level at about 27 MMBF. Private lands provide a very small portion of the wood products for these mills; therefore, the harvest from the public lands in the planning area is important for meeting the demand for wood products.

LANDS

Landownership and Land Disposition

The planning area boundaries encompass about 12.5 million acres of land and mineral estate in Laramie, Albany, Carbon, and eastern Sweetwater counties. Approximately 4 million acres (32%) of this land is public land administered by the BLM.

The public lands in Laramie County and southern and eastern Albany County consist of small scattered tracts at least 100 miles from the administrative headquarters in Rawlins. The "checkerboard" landownership pattern that dominates the central portion of Albany, Carbon, and Sweetwater counties was created by railroad land grants that occurred from 1850 to 1871. In northern and western Albany County and in south central Carbon County, most of the non-railroad grant lands were patented to private parties in part through several homestead acts. This has resulted in a public landownership pattern of various separated parcels.

The remainder of the planning area (in northern and southern Sweetwater County and in southwestern and northern Carbon County) contains large blocks of public land. The "blocked-up" character of these lands makes them relatively easy to manage.

The BLM's management programs are affected by the broken landownership pattern in portions of the planning area. Implementing management plans on scattered lands is difficult because management practices on surrounding private lands tend to influence land use on public lands. Most of the small parcels lack legal public access, and unauthorized use is common. Often the costs of detecting and terminating trespass, managing grazing use, and processing rights-of-way and other applications for land use exceed the monetary returns from such uses. Landownership adjustments present opportunities to improve this situation. Such adjustments can be made through sale or exchange.

Exchanges serve several purposes, among them consolidating landownership to facilitate resource management. Exchanges also can help in the accomplishment of resource management programs by enabling the BLM to acquire land with high public resource values.

Approximately 7,000 acres of public and formerly public land have been dedicated (leased, patented, or withdrawn) for recreation and public purposes. Sanitary landfill leases have been issued to Bairoil, Wamsutter, Rawlins, and Saratoga under the R&PP Act (see Glossary). The BLM is exploring the possibility of selling existing and future sites to the respective municipalities.

Two oil and gas produced-water evaporation pits have been authorized by right-of-way. The BLM is exploring the possibility of selling existing and future sites to the parties involved.

Cities and towns in the planning area may need to acquire land for expansion purposes. These include Baggs, Bairoil, Creston Junction, Rawlins, Red Desert, and Wamsutter. Bairoil's needs are critical because public land is conflicting with the town's orderly expansion. The growing community is surrounded by "blocked" public land. Landownership adjustments present an opportunity to address this problem.

The federal mineral estate lies in relatively large blocks in the northern portion of the planning area and in southern Carbon and Sweetwater counties. The central portion of the planning area, southern Albany County, and extreme western Laramie County are dominated by a checkerboard pattern. The remainder of Laramie County contains scattered federal mineral estate. The areas of scattered and checkerboard federal mineral estate present problems in management efficiency. Much of the land is "split estate"; that is, nonfederal surface over federal minerals. Mineral exchanges can be used to eliminate split estate situations or to complement resource management programs by protecting sensitive areas from mineral development.

Access

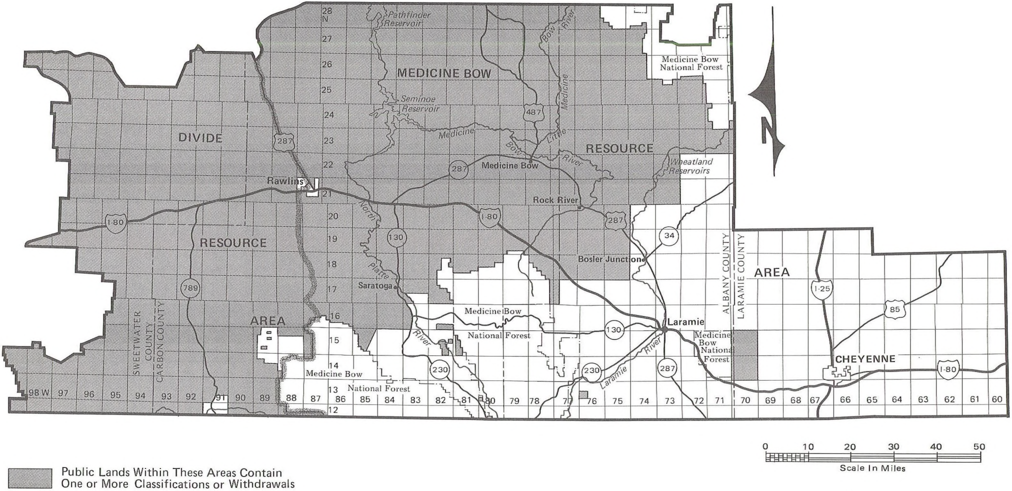
There is legal access to portions of the public land in the planning area via existing federal, state, and county road systems and via unimproved roads. In other areas, there is no public access to large blocks of public land, or the access is controlled by private landowners. Many of these areas have high values for hunting, fishing, and other recreational pursuits. Many complaints are received each year from members of the public who are denied access to these lands; however, these occurrences are usually in the checkerboard.

An easement acquisition program in the checkerboard would provide access only to public lands within 1 mile of the particular road acquired. However, there are opportunities in the planning area for acquisition of public access to areas that could meet important resource management objectives. Acquisition of easements can be accomplished through either the exchange program or the access program.

Withdrawals

Approximately 3,650,000 acres (91%) of the federal surface and 903,000 acres (23%) of the federal locatable minerals in the planning area are segregated by withdrawals or classifications (see map 21). Table 5 summarizes the existing withdrawals. Withdrawals and classifications usually are placed on land or minerals to protect resource values or existing facilities. However, they can limit management options because they selectively prohibit certain management actions that would protect other important resource values.

Classification and Multiple Use Act (C&MU) public land classification order (W-6227), published in the *Federal Register* on November 8, 1967, classified approximately 3,641,500 acres of public land in the planning area for retention in federal ownership, for segregation from sale under section 2455 of the Revised Statutes (43 U.S.C. 1171), and from entry under the agricultural laws. In addition, 3,106 acres were further segregated from entry under the 1872 General Mining Law. The BLM terminated this classification on July 28, 1982. However, because of a preliminary injunction issued by Judge Pratt in *National Wildlife Federation v. Burford, et al.* (Civil Action No. 85-2238 D.C.D.C.), this classification is still in effect. Should the BLM prevail on appeal of this injunction, the termination published on July 28, 1982, will have become effective.



Map 21

EXISTING CLASSIFICATIONS AND WITHDRAWALS

Medicine Bow-Divide Resource Management Plan

The BLM will review existing withdrawals by 1991 to see if they are serving their intended purpose. Limitations on opportunities for land disposal, mineral development, and other management options could be removed through revocation of withdrawals that are no longer needed. The review status of each existing withdrawal is indicated in table 5.

TABLE 5

ACREAGE OF WITHDRAWALS AND CLASSIFICATIONS IN THE PLANNING AREA

Classification or Withdrawal	County	Segregative Effect	Mineral Entry	Agricultural Entry or Disposal	Agency Jurisdiction[1]	Review Status
Stratton hydrology study withdrawal	Carbon	Prohibits mineral and agricultural entry and disposal.	2,694	2,694	BLM	Reviewed in 1985; recommended for continuation.
R&PP classifications (under lease or patent)	Laramie, Albany, Carbon, Sweetwater	Prohibits mineral and agricultural entry and disposal.[2]	2,965	1,144	BLM	Not subject to review.
R&PP classifications (not under lease or patent)	Laramie, Albany	Prohibits mineral and agricultural entry and disposal.[2]	4,197	4,197	BLM	Reviewed in 1982; recommended for termination.
Administrative site withdrawals	Carbon	Prohibits mineral and agricultural entry and disposal.	93	93	BLM	Reviewed in 1981 and 1982; 87 acres recommended for termination; 6 acres recommended for continuation.
Administrative site withdrawals	Carbon, Albany	Prohibits mineral and agricultural entry and disposal.	720	720	FS	Pending review
Reclamation withdrawals	Carbon	Prohibits mineral and agricultural entry and disposal.	73,290	73,290	BuRec	Pending review
Sybille wildlife refuge withdrawal	Albany	Prohibits mineral and agricultural entry and disposal.	681	681	FWS/BLM	Reviewed in 1982; recommended for continuation.
Hutton Lake, Bamforth, and Pathfinder Wildlife Refuge withdrawals	Albany, Carbon	Prohibits mineral and agricultural entry and disposal.	3,234	3,234	FWS	Pending review
Air navigation site withdrawals	Carbon	Prohibits mineral and agricultural entry and disposal.	440	440	FAA	Reviewed in 1983, 1984 and 1985; recommended for continuation.
Public water reserve withdrawals	Laramie, Albany, Carbon, Sweetwater	Prohibits nonmetalliferous mineral and agricultural entry and disposal. Protects water sources.	41,245	41,245	BLM	Reviewed in 1982, 14,357 acres recommended for continuation (see Lands appendix).
C&MU classifications	Albany, Carbon, Sweetwater	Prohibits agricultural entry and disposal.	3,916[3]	3,642,310	BLM	Reviewed in 1982, recommended for termination.
Small tract classifications	Carbon, Albany	Prohibits mineral and agricultural entry and disposal.[4]	15	15	BLM	Reviewed in 1981, recommended for termination.
Oil shale withdrawals	Carbon, Sweetwater	Prohibits mineral and agricultural entry and disposal.	564,758	564,758	BLM	Reviewed in 1983, recommended for termination.

TABLE 5 (Continued)

ACREAGE OF WITHDRAWALS AND CLASSIFICATIONS IN THE PLANNING AREA

Classification or Withdrawal	County	Segregative Effect	Mineral Entry	Agricultural Entry or Disposal	Agency Jurisdiction[1]	Review Status
Power site withdrawals	Albany, Carbon	Prohibits agricultural entry and disposal. Limits mineral entry.		5,150	BLM	Pending review
Stock driveway withdrawals	Albany, Carbon, Sweetwater	Prohibits agricultural entry and disposal. Protects water sources. Limits mineral entry.		263,258	BLM	Reviewed in 1984, recommended for modification; 193,983 acres should be continued and 69,275 acres should be terminated.
Coal classification	Carbon, Sweetwater	Prohibits nonmetalliferous mineral entry and disposal of coal.	671,768		BLM	Reviewed in 1983, recommended for termination.
Coal withdrawal	Carbon, Sweetwater	Prohibits nonmetalliferous mineral entry and disposal of coal.	610,170		BLM	Reviewed in 1983, recommended for termination.
Approximate totals[5]			903,000	3,650,000		

[1] BLM = Bureau of Land Management, U.S. Department of the Interior; BuRec = Bureau of Reclamation, U. S. Department of the Interior; FAA = Federal Aviation Administration; FWS = Fish and Wildlife Service, U.S. Department of the Interior; FS = Forest Service, U.S. Department of Agriculture.

[2] Not subject to disposal except under the Recreation and Public Purposes Act.

[3] C&MU further segregated 3,916 acres against mineral location (see discussion on footnote 1 in table table 1 in chapter 2.

[4] Not subject to disposal except under the Small Tract Act, which was repealed by FLPMA.

[5] Total acreage will appear to be in error because some withdrawals overlap.

Opportunities also exist to protect resource values or existing facilities through new withdrawals.

Utility/Transportation Systems

The planning area has about 1,800 active rights-of-way for power transmission and distribution lines; oil and gas pipeline and access roads; water pipelines, reservoirs, and ditches; railroads; and public roads and highways. The approximate number of authorizations and the acreage disturbed over the past ten years are depicted on figures 5 and 6. Several de facto corridors have been established by use in the planning area (see map 22). Major rights-of-way usually follow the existing corridors. Smaller distribution/access facilities tend to vary more from existing corridors. Opportunities exist to reduce potential conflicts with other resource values and uses by routing new rights-of-way along existing corridors.

The energy boom resulted in a proliferation of facilities associated with the development of oil and gas fields. These nontransmission projects do not lend themselves to the utility/transportation corridor concept; however, opportunities exist to minimize conflicts with other resource values and uses by planning these facilities on a projectwide or fieldwide basis.

Rights-of-way for communication sites have proliferated on hills near population centers and on mountaintops in the planning area. The Federal Communications Commission (FCC) regulates the frequency and range of transmitters, but the BLM must ensure that power interference and structural/directional interference do not occur.

Conflicts can occur where a high-power transmitter is allowed on an established low-power site and subsequently blows low-power transmitters off the airwaves. Opportunities exist to avoid conflicts over transmitter facilities by establishing site categories with buffers to protect

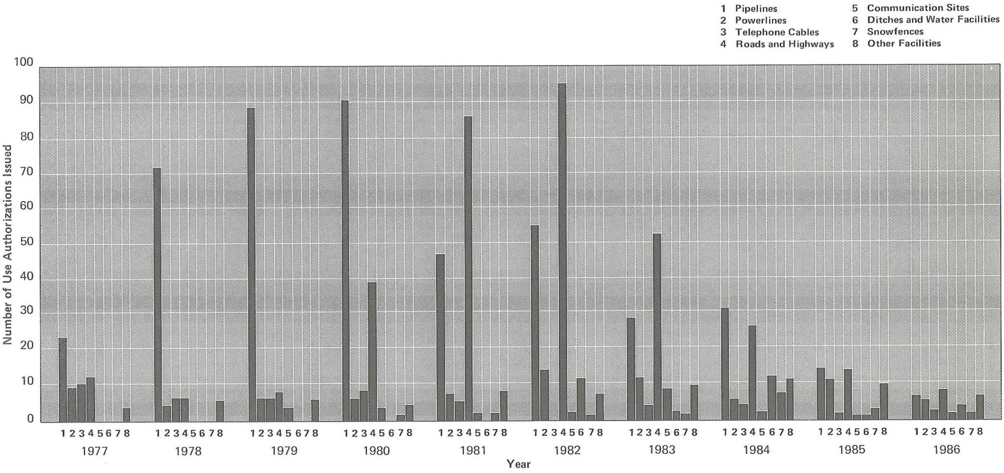


Figure 5
ACREAGE DISTURBED BY UTILITY/TRANSPORTATION SYSTEMS

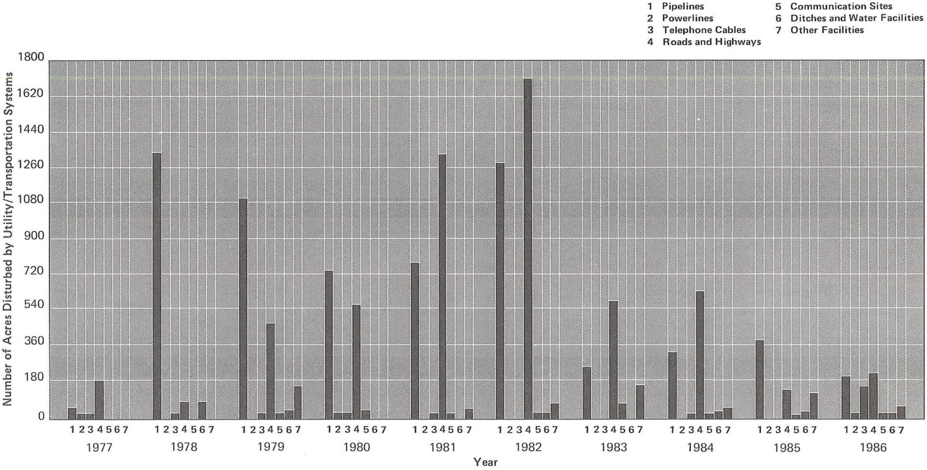
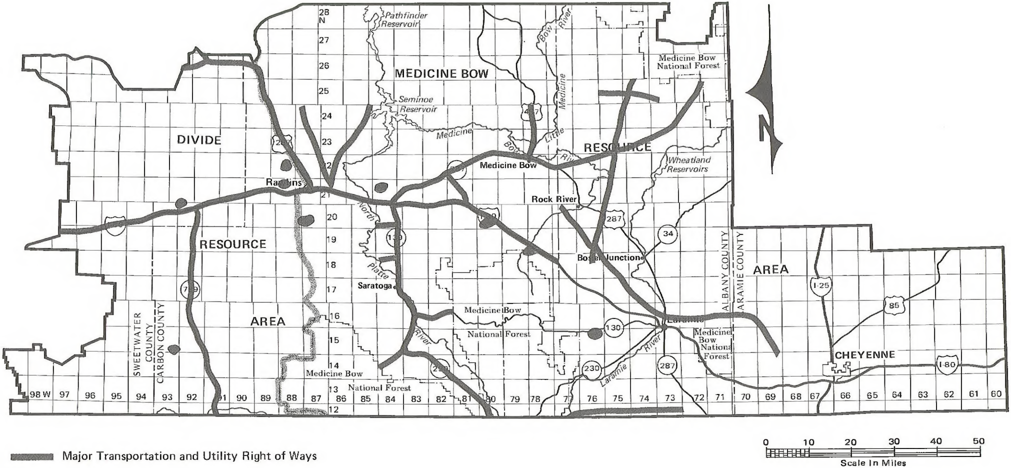


Figure 6
USE AUTHORIZATIONS ISSUED IN THE PAST TEN YEARS



Map 22

MAJOR TRANSPORTATION AND UTILITY RIGHTS-OF-WAYS

Medicine Bow-Divide Resource Management Plan

the integrity of the sites. In addition, sites can be spaced to protect facilities from directional/structural interference.

LIVESTOCK GRAZING

Introduction

As explained in chapter 1, grazing EISs have been completed for the Divide Resource Area and for parts of the Medicine Bow Resource Area (see map 2). The rangeland decisions analyzed in the Divide grazing EIS (USDI, BLM 1983a, 1983b) and the Seven Lakes grazing EIS (USDI, BLM 1978a, n.d.) are incorporated into this document by reference. The livestock grazing decisions for the Medicine Bow grazing EIS area are included in the text of this document.

At present 261 operators are licensed to graze livestockdomestic cattle, horses, and sheepin 354 allotments on the public lands in the Medicine Bow grazing EIS area. One inactive allotment is not licensed for grazing use. The primary kind of livestock is cattle, with 134,304 animal unit months (AUMs) of use on 314 allotments. Substantial numbers of sheep use the area, both in trailing through and on seasonal range, with 25,155 AUMs licensed on 32 allotments. Most of the operators who graze horses raise them for recreational use or for use in their livestock operations. Fifteen allotments and 532 AUMs are used by horses.

Operations entirely or partially within the boundaries of the Medicine Bow grazing EIS area vary in size from 4 to 20,618 AUMs of public land use.

A total of 148 allotments have fewer than 100 AUMs of public land grazing preference, and 1 allotment has more than 20,000 AUMs allocated to livestock grazing. AUMs in the remaining 205 allotments range from 100 to 4,800.

The majority of the allotments within the study area are individual use allotments; that is, there is only one operator. Eleven allotments have two operators and only three allotments have three operators.

The characteristics of the livestock grazing allotments are summarized in table LVGR AP-1 (in the Livestock Grazing appendix).

Types of Operations

Most of the small operators in the grazing EIS area have cow-calf operations. In these operations, cows that produce a calf each year are retained for breeding. After six to twelve months, most of the calves are sold; however, a few are retained for herd replacement.

The larger operators usually run yearling operations or combination cow-calf/yearling operations. These operators maintain a base breeding herd and hold the calves until they reach a weight of about 600 pounds (about one year) and then sell. Several other types of yearling operations are practiced in the area. Some operators do not maintain a base breeding herd; instead, they buy calves, hold them on BLM-managed rangeland over the grazing season, and sell them in the fall.

Other operators lease the cattle from an out-of-state or out-of-area corporation, run them on the range for the grazing season, and then return them to the owner in the fall. These operators are paid according to the amount of weight the cattle gain during the grazing season.

Some of the operations are based in other states. Cattle are shipped in to graze on BLM-managed rangeland for the grazing season and then shipped back to feedlots for fattening after the grazing season. These cattle may be purchased from many different states or even locally, depending on cattle prices.

Sheep operations differ in many ways from cattle operations. Types of labor input and sources of revenue are two examples of the differences between a sheep operation and a cattle operation. Of the 261 livestock operators in the grazing EIS area, only 18 are sheep operators.

Some of the operators in the area are authorized to run livestock throughout the year. Conversions in kind of livestock grazed have been from sheep to cattle. Conversion from cattle to sheep has not occurred in the grazing EIS area.

As part of the allotment categorization process, the current grazing management situation was analyzed, and determinations were made for all allotments. The Livestock Grazing appendix contains a description of criteria used to categorize the allotments, a list of the "I" allotments, and the specific categorization criteria that placed individual allotments into the "I" category. A total of 420,667 acres (42% of the public land in the Medicine Bow grazing EIS area) was placed in the "I" category. The following summary lists some of the major usage problems and the total acreage in "I" allotments that is affected by each problem.

> Vegetation production is not satisfactory, key species are not present in satisfactory amounts, and species composition indicates unsatisfactory range condition on portions of

36 allotments comprising 322,349 acres (77%) of the 420,667 acres in "I" category allotments.

Current trend in range condition is unsatisfactory on portions of 36 allotments comprising 210,702 acres (50%) of the "I" allotments.

Unsatisfactory distribution of grazing animals and forage utilization has been identified on portions of 51 allotments comprising 412,893 acres (98%) of the "I" allotments.

Improper turn-out dates and seasons of use are in effect on portions of 45 allotments comprising 340,261 acres (81%) of the "I" allotments.

As discussed in the "Vegetation" section of this chapter, past utilization problems and improper seasons of use have led to vegetation composition changes less productive for livestock grazing. Vegetation production decreases with a decline in density, cover, and vigor. The amount of the decrease varies greatly with site potential. The last five-year average use, which is 8.9% below active preference, partially reflects the decreased productivity of the land.

MINERAL RESOURCES

Geologic Setting

Rocks of Precambrian to Late Tertiary and Quaternary ages are exposed in the planning area. The oldest rocks are developed along the breached axes of several mountainous or uplifted areas, and successively younger rocks are developed and exposed at the margins of these uplifts and in the intermontane basins. The major uplifted areas within the area of this report (Medicine Bow Mountains, Sierre Madre, Ferris Mountains, Seminoe Mountains, Shirley Mountains, Rawlins Uplift, and Laramie Mountains) were formed by differential structural elevation caused by compressive and vertical forces in the crust during the Laramide Orogeny (Late Cretaceous-Late Eocene). The uplifts have cores of Precambrian igneous and metamorphic rocks. As a byproduct of the Laramide Orogeny, sediment-filled intermontane basins developed.

The main basins are Shirley Basin, Denver Basin, Laramie Basin, Hanna Basin, Washakie Basin, and the Great Divide Basin. The sedimentary rocks that flank the uplifts and underlie the basins range in age from Cambrian to Miocene.

The basins are more important than the mountains in terms of economics and natural resources. Along the basin margins the outcropping sedimentary strata expose limestone, gypsum, bentonite, and dimension stone. Coalfields and uranium deposits are formed farther out in the basins. The sedimentary rocks that extend deep under the basins act as reservoirs for oil and gas accumulations.

The general distribution of the various formations in the resource area is shown on a geologic map by Love and Christiansen (1985). More detailed geologic maps of portions of the area and reports containing discussions of the stratigraphy and petrology of the rocks of the area are listed in the References. Figure 7 is a chart prepared by the Wyoming Geological Association that shows stratigraphic nomenclature and sequences as used in Wyoming.

Leasable Minerals

Coal

There are several basins in the planning area that contain deposits of coal with development potential. Coal mining has been an important activity in the Hanna basin for many years.

The coal resources of the planning area have been summarized most recently in the Green River-Hams Fork EISs, Round One and Round Two (USDI, BLM 1980a, 1980b, 1983c). Documents containing more detailed descriptions of the coal resources in the planning area are listed in the References. Map 23, which was adapted from a geological survey of Wyoming map (Hausel, et al. 1979), shows the coal-bearing strata potential in the resource area. Map 24 shows the coal areas that are acceptable for further leasing consideration and have been considered in the land use planning process. The coal appendix explains the screening process that determines coal accessibility and identifies coal with development potential.

Coalfields in the resource area are the Great Divide Basin, Little Snake River, Rock River, Kindt Basin, and Hanna coalfields.

Coals occur in rock sequences deposited during either the Cretaceous period (66-135 million years ago) or during the younger Tertiary period (38-66 million years ago). The most widespread coal-bearing rocks are Cretaceous in age and usually crop out only as narrow bands of upturned rock around basin margins and uplifted areas. The relatively flat-lying Tertiary

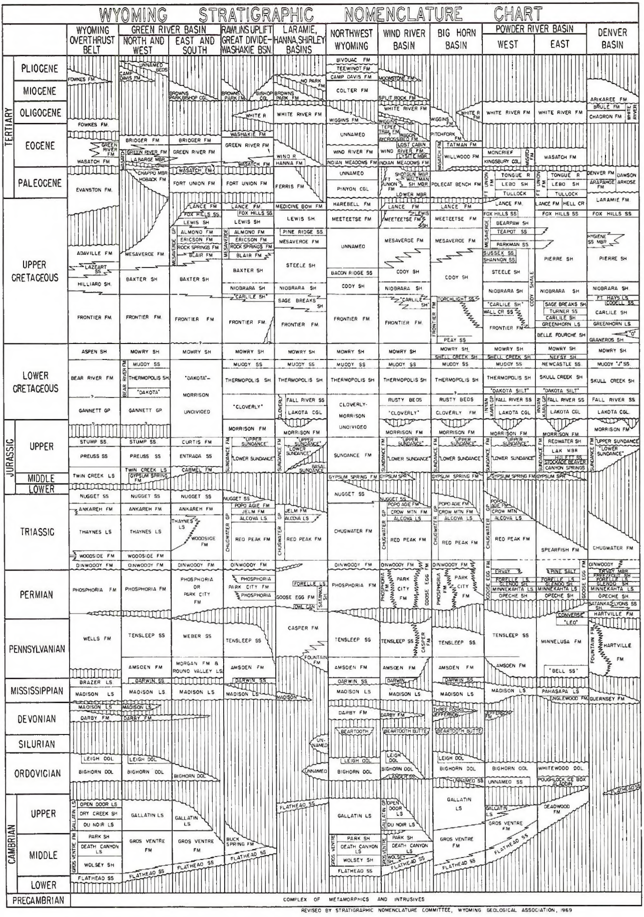
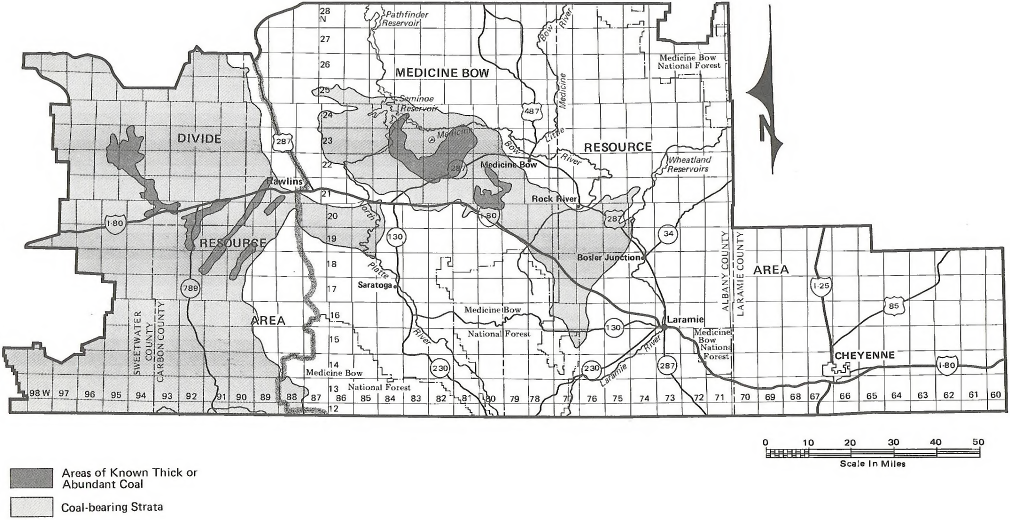


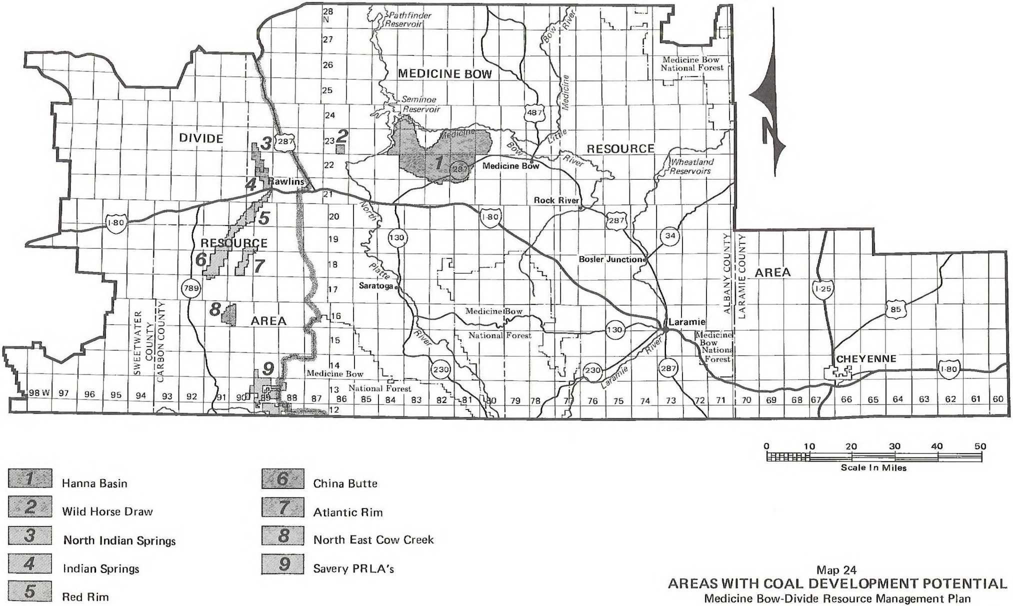
Figure 7
WYOMING STRATIGRAPHIC NOMENCLATURE CHART



Map 23

COAL MAP

Medicine Bow-Divide Resource Management Plan



Map 24

AREAS WITH COAL DEVELOPMENT POTENTIAL

Medicine Bow-Divide Resource Management Plan

rocks occupy the central portions of most of the coal-bearing areas, where they overlie the older Cretaceous rocks.

Cretaceous and Tertiary coal-bearing formations contain numerous coals that are separated from one another by as little as a few inches to as much as hundreds of feet of rock. The Cretaceous coals interspersed in these rocks generally are less than 10 feet thick. The Tertiary coals, which were deposited during the Eocene and Paleocene epochs, often exceed 10 feet in thickness.

Most of the coal mining in the planning area has been from the Hanna coal field. Although coal beds occur in the Upper Cretaceous Mesaverde Group and the Medicine Bow Formation, the most significant beds are in the Ferris Formation of Upper Cretaceous and Paleocene age and in the Hanna Formation of Paleocene and Eocene age.

Oil and Gas

Oil and gas exploration in the planning area started in 1915. Since that early beginning, more than 3,600 wells have been drilled. Most oil and gas are found in sedimentary rocks in occurrences that may be divided into structural or stratigraphic traps. A structural trap is one in which the oil or gas is maintained in place by mechanical means such as folding, faulting, or some combination of the two. Stratigraphic traps involve a change in rock type, from permeable to impermeable, with the oil and gas held in the permeable portion.

Most early oil discoveries in the planning area were in large structural traps with obvious surface expression. Modern exploration is focused on deep, subtle structures. Sophisticated seismic techniques are used to discover these new reserves.

Reservoir rock in the planning area ranges from Tertiary to Precambrian in age. In general, fields in stable interior basin areas like the Washakie Basin and the Great Divide basin are characterized by stratigraphic traps (such as Wamsutter and Creston) and produce from younger (Cretaceous and Tertiary) formations. Fields in more highly deformed basin margins usually are characterized by structural traps (such as Lost Soldier and Quealy Dome), and production is from older rocks.

The planning area contains approximately 5 million acres of federal mineral estate. All of this acreage is available for oil and gas leasing, with approximately 85% leased at any one time.

Oil and gas are produced from 150 fields in the planning area, 111 of which are now active (see map 25). Eighty-seven of the fields involve all or some federal mineral estate. Since their discovery, the various fields have accounted for more than 400 million barrels of oil and 1 trillion cubic feet of natural gas. Production from all mineral estates in the planning area in 1985 was approximately 8.1 million barrels of oil and 68.2 billion cubic feet of natural gas.

Approximately 8% of the oil and 9% of the gas produced in Wyoming have come from fields in the planning area. The leasing and development of federal minerals by the petroleum industry contribute significantly to the employment and income in the planning area and the state.

The total number of applications for permit to drill (APDs) and the number of wells drilled in the planning area from 1979 through 1985 are shown on table 6. During this seven-year period, the majority of the wildcat and development gas wells were drilled in the Washakie known geologic structure (KGS). The area with the next highest development was the Wertz-Lost Soldier, where activity was primarily in oil development wells.

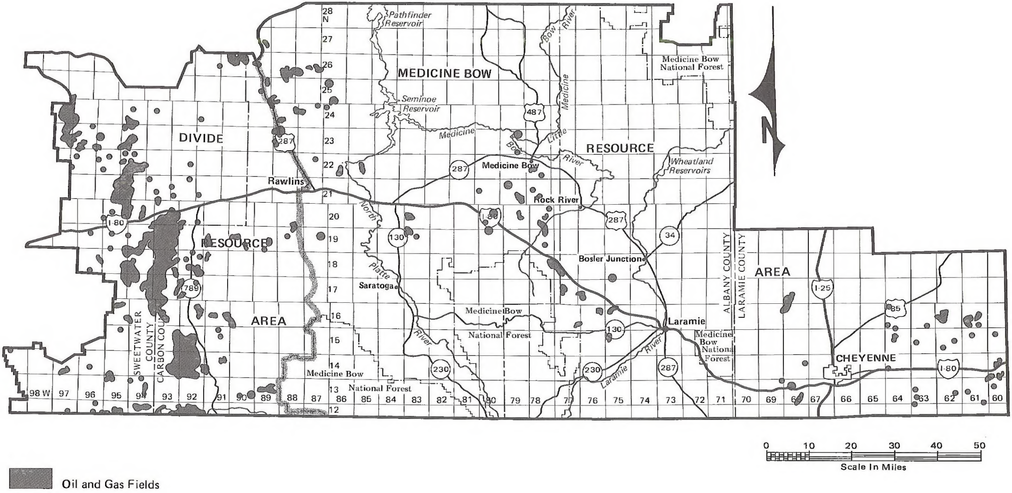
TABLE 6

OIL AND GAS WELLS PERMITTED AND DRILLED ON FEDERAL MINERAL ESTATE IN THE PLANNING AREA

Year	1979	1980	1981	1982	1983	1984	1985
Wells permitted	73	77	88	52	62	86	82
Wells drilled	64	67	77	35	49	77	65

The planning area contains 56 named and unnamed KGSs covering approximately 1.5 million acres of federal mineral estate. Since the acreage within the boundaries of each KGS defines the presumed productive limits of oil and gas traps, most drilling and development activities in the known oil and gas reservoirs will take place within this acreage. The concentration and number of surface-disturbing activities within the KGSs vary, depending on the geologic formation depths from which the hydrocarbons are produced and on whether the field produces oil, gas (and condensate), or both.

To facilitate evaluation of the effects of management actions on oil and gas activities, a system has been devised for rating oil and gas potential in the planning area. Accurately rating



Map 25

OIL AND GAS FIELDS

Medicine Bow-Divide Resource Management Plan

the potential for the discovery of oil and gas on the public mineral estate is difficult, as is predicting locations for future drilling and production. However, the rating system will remain dynamic, and as new information is gathered, necessary rating changes can be made. Map 26 shows the ratings for the planning area, including KGSs and areas rated as having high, moderate, low, or no potential. The ratings are defined as follows:

Known Geologic Structures: A KGS is technically the trap in which an accumulation of oil or gas has been discovered by drilling and determined to be productive, the limits of which include all acreage that is presumed productive.

High Potential: Geologic structures and formations highly favorable for the accumulation of oil and gas are known to exist.

Moderate Potential: Many favorable nonproducing geologic structures and formations are present, but not all potentially productive formations have been drilled and tested.

Low Potential: Geologic structures and formations are well-defined, and potentially productive formations have been drilled, tested, and failed to produce oil and gas.

No Potential: Geologic structures and formations are present, but the potential for oil and gas accumulations does not exist. These areas contain geologic formations that do not meet the present criteria for oil and gas accumulations; that is, there are no source rocks, porosity and permeability have not been developed (except for fractures), and no traps are thought to be present.

Oil Shale

Oil shale is found in the Washakie Basin portion of the planning area in the Luman Tongue of the Green River Formation, the Niland Tongue of the Wasatch Formation, the Tipton Tongue of the Green River, and the Wilkins Peak and Laney Shale Members of the Green River. According to Trudell, Roehler, and Smith (USDI, Bur. Mines 1969, p. 204), in an aggregate thickness of more than 1,000 feet of oil shale in the various units, "probably less than 15% yields 15 gallons per ton or more by Fischer assay." Oil shale is not expected to be an economically important leasable mineral in the planning area in the forseeable future.

Sodium Salts

Sodium salts occur in many of the small playa-lake basins that are common in the resource area. Reserves, quality, or economic potential of dissolved or precipitated salts in basins are not known, and they are not considered economically important in the planning area.

Locatable Minerals

Introduction

A variety of metallic and nonmetallic minerals are found in the planning area. Many mineral deposits are valuable but are commercially undeveloped. The minerals emphasized in this document are those that are found on BLM-administered mineral estate and in which present interest is being expressed through active or recently active exploration or development, or where potential interest has been expressed.

The BLM's management responsibilities for locatable minerals are to enforce the surface management regulations (43 CFR 3809), to protect the public lands from unnecessary and undue degradation, and to keep mineralized lands available for prospecting and location under the 1872 Mining Law.

Map 27 shows selected locatable mineral occurrences that fall within consideration of this RMP/EIS.

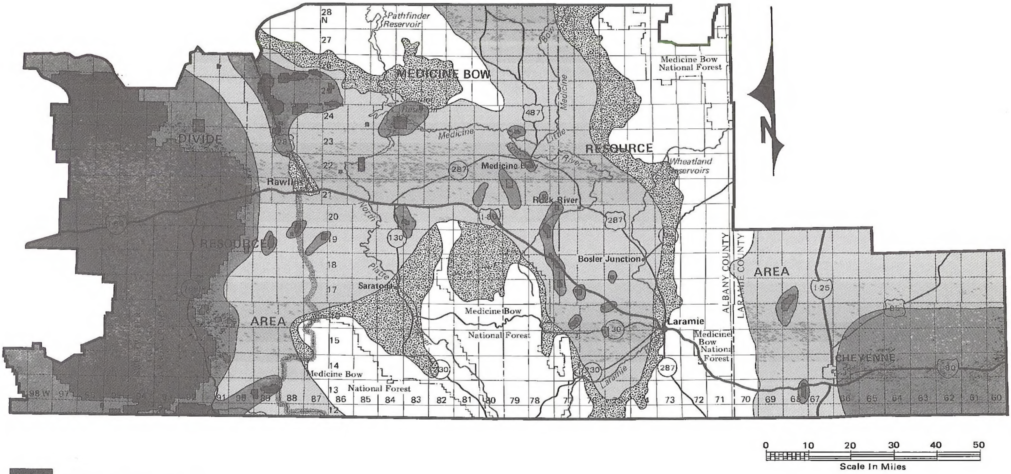
General distribution of the various mineral occurrences in the planning area is shown on the *Metallic and Industrial Minerals Map of Wyoming* (Harris, Hausel, and Meyer 1985). Literature containing detailed descriptions of the mineral occurrences in the planning area is listed in the References.

Uranium

In recent decades, uranium exploration has been surpassed only by exploration for oil and gas. The large sediment-filled Tertiary basins are prime areas for uranium exploration. Exploration has been concentrated on locating sedimentary type uranium mineralization, resulting in the discovery of several large, low-grade uranium deposits.

More than 17 million tons of uranium ore have been taken from lands in the planning area since mining began in the 1950s. Nearly all the uranium has been produced in Shirley Basin, Red Desert, and Poison Basin. Several other known occurrences of uranium are located throughout the planning area, some of which have produced small volumes of ore.

Uranium deposits in the Red Desert are located in the Eocene Battle Springs Formation. In Poison Basin, ore is mined from the Miocene Brown's Park Formation. In the Shirley Basin, uranium deposits are mined from the Eocene Wind River



▇ Known Geologic Structure

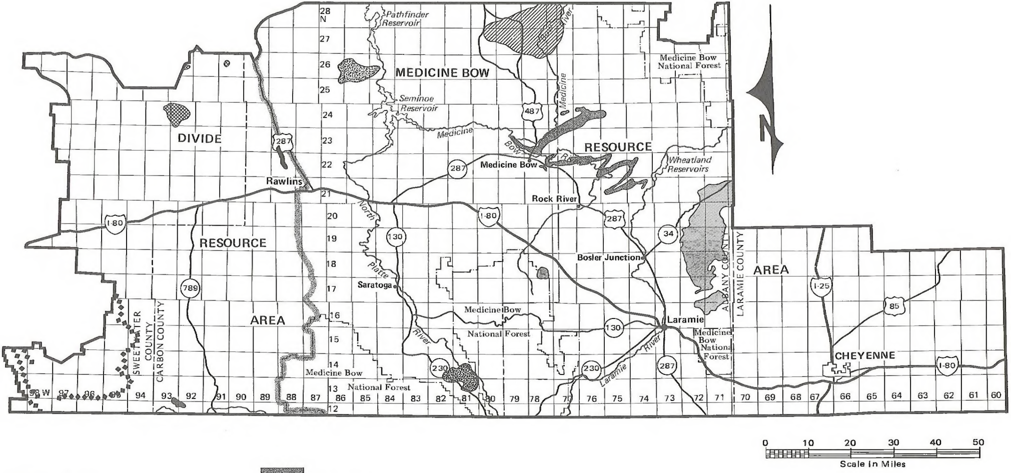
▆ High Oil and Gas Potential

▒ Moderate Oi l and Gas Potential

░ Low Oil and Gas Potential

☐ No Oil and Gas Potential

Map 26
OIL AND GAS POTENTIAL
Medicine Bow-Divide Resource Management Plan



♦♦♦♦♦♦ Zeolites

▩ Red Desert - Uranium

■ Poison Basin - Uranium

▨ Shirley Basin - Uranium

░ Seminoe District

▓ Bentonite

▒ Cooper Hill District

▩ Prospect Mountain

░ Anorthosite Complex

■ Limestone

Map 27

SELECTED LOCATABLE MINERAL OCCURRENCES

Medicine Bow-Divide Resource Management Plan

Formation. Other potentially important uranium deposits are located in uraniferous lignites in the Wasatch Formation in the Red Desert, in the Miocene North Park Formation at Miller Hill and Ketchum Buttes, and in the Paleocene Fort Union Formation near Red Rim.

The only currently operating mine and mill in Wyoming are in Shirley Basin. Other operations in Shirley Basin and in the Red Desert are on standby. Exploration activities also have slowed dramatically. Some assessment drilling is being done to hold the more important mining claims.

Other Minerals

The planning area is rich in other mineral resources that have never been developed to any great extent. Of recent interest in the planning area has been the kimberlitic diatremes and associated diamonds. Evaluation is ongoing, and searches for additional pipes are underway. None of the pipes have been found on BLM-administered lands.

Interest and activity are continuous in the anorthosite complex of the Laramie Range, with its potential source of alumina. No process for using these resources has been proven competitive with bauxite.

Zeolites in potentially minable quantities occur in the Washakie Basin. These zeolites, most of which lie outside the planning area, represent some of the more extensive deposits found in the nation. They never have been adequately evaluated because the area has been withdrawn from mineral entry since the 1930s.

Bentonite deposits near Medicine Bow have been mined in the past. Exploration and development drilling and testing continue in the area. There has been no extensive development because of the low grade and small size of the deposits and the distance from processing facilities.

The historic metal-producing regions are scattered throughout the mountainous parts of the planning area. Several of these regions are on BLM-administered lands. During the past 50 or 60 years the development of rare and precious metals has been absent. The areas where there has been activity recently are the Cooper Hill district, Prospect Mountain, and the Shirley Mountains district.

High calcium carbonate limestone is mined north of Rawlins for use in coal scrubbers. The yearly production from the mine for scrubbers and road aggregate is more than 100,000 cubic yards.

Salable Minerals

Introduction

Some of the salable minerals in the planning area are petrified wood and common varieties of sand, stone, gravel, pumice, pumicite, cinders, and clay.

The planning area contains large mineral material deposits, but since they are of low unit value and transportation costs would be high, their importance is principally local. In higher population areas, quarries and pits have been used for many years and have become or are becoming depleted. Some mineral material deposits have been or could be lost to production through encroachment from urban growth.

Sand and Gravel

There are sand and gravel deposits throughout the planning area. These deposits consist principally of alluvial and colluvial deposits. The alluvial deposits are found along major and tributary drainage courses and on benches and terraces above the present drainages. Colluvial deposits are found at the base of essentially any bedrock outcrop of appreciable relief and within alluvial fans associated with the larger drainages.

Stone

The planning area contains a variety of potentially important stone materials. The Pennsylvanian and Mississippian limestones are favorable for cement rock, dimension stone, and high calcium limestone. Potential sources for building stone, rip-rap, and crushed aggregate are any quartzite, sandstone, or limestone-dolomite units. Granitic rocks are used as an aggregate source in the eastern part of the planning area. The resource potential for these commodities depends partly on their location and accessibility with respect to markets and use areas.

Scoria

Scoria is a local term for naturally baked and thermally altered shale or clay resulting from the in situ burning of adjacent coal beds. Potential resources are only of local importance. Scoria is found in conjunction with coal beds associated with the Almond, Lance, and Fort Union units in the Washakie Basin and Great Basin and with the Hanna unit in the Hanna Basin. The scoria is useful as a road base in areas where other, more desirable aggregates are not readily available.

RECREATION

Introduction

The availability of public lands in the planning area for recreation is important both to local residents and to nonresidents. The planning area contains a wide variety of outstanding recreation opportunities in diverse settings. From the badlands of Adobe Town to the meandering North Platte River to the subalpine Ferris Mountains, visitors enjoy opportunities for superb antelope, elk, and deer hunting; primitive recreation; and world class trout fishing. Other unique recreation opportunities are also available, including caving and hiking the Continental Divide. It is not surprising that the recreation industry contributes significantly to the local economy.

The analysis in this document focuses only on the most important recreation resources: the three special recreation management areas (SRMAs), big game hunting, fishing, ORV use, and developed recreation sites.

Special Recreation Management Areas

North Platte River

The North Platte River is the most important resource for water-based recreation in the planning area. It offers exceptional canoeing and fishing. The river, which is famous as a blue ribbon trout stream, attracts visitors from across the nation. The SRMA (see map 28) extends from where the river enters public lands in the southern portion of the planning area to Seminoe Reservoir. Only public land is considered part of the SRMA.

Most of the river meanders through the "checkerboard," in which sections of land alternate between public and private ownership. Within the planning area, 15 river miles border public land on at least one shore. Since the river is popular for recreation, each parcel of public land is important for providing shoreline access.

Opportunities exist to enhance public access to river recreation by adding lands along the North Platte River to the public base. Those areas have been identified as important for recreation.

Visitation estimates indicate that approximately 15,000 visits annually occur on the North Platte. It is estimated that between 50% and 75% of the use is from people who live outside of the local area. Those who like to fish use the river when it is free of ice. Hunters for both big game and waterfowl use the river during the appropriate hunting seasons as an access route to public land.

Major BLM access points are the Bennett Peak and Corral Creek recreation sites, Prospect Creek, and the Dugway. In addition, the WGFD has obtained easements in a number of locations, including the Plattoga Ranch, the "Rochelle Easements" on the Bolton Ranch, Pick Bridge, and the "Foote Access." Other tracts of BLM-administered land that abut the river serve as important stopover points for boaters.

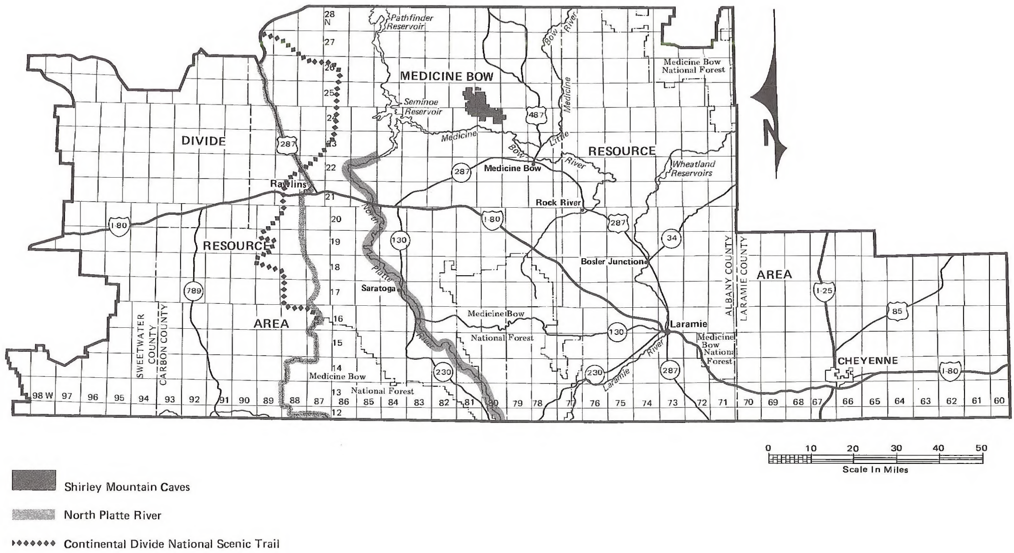
Prospect Creek has been popular in the past as a launch and take-out point for boaters. Its popularity stemmed from its favorable location and accessibility to a major highway. The site is adjacent to the Medicine Bow National Forest just downstream from Northgate Canyon; the canyon offers the only true whitewater boating in southeastern Wyoming. Boaters used Prospect Creek as a take-out because the shuttle was relatively short–it was 12 miles back to the launch point, with only 8 miles on dirt road. However, in recent years, weather and lack of maintenance have made the road to Prospect Creek impassable to vehicles with boat trailers and nearly impassable even to four-wheel drive vehicles. With this site unavailable, boaters are forced to use the FS campground just upstream of Prospect Creek as a take-out. This requires a long shuttle of 50 miles, including 30 miles on dirt roads.

Continental Divide National Scenic Trail

The Continental Divide National Scenic Trail was established by Congress in 1978. The trail crosses about 130 miles of the planning area, including 80 miles of BLM-administered public land, 40 miles of private land, and 10 miles of state land.

The Forest Service published a comprehensive management plan for the trail in late 1985. The plan set broad goals and policy by which the trail's local management would be guided. The BLM is responsible for implementing on the public lands the broad direction set forth in that plan.

While the trail route has yet to be specifically identified, it will generally fall on the east rim of the Great Divide Basin. This includes Atlantic Rim, Haystack Mountains, and Ferris Mountains. Many primitive roads are adjacent to the actual



Map 28
SPECIAL RECREATION MANAGEMENT AREAS
Medicine Bow-Divide Resource Management Plan

Continental Divide, and these appear to be the most feasible route locations.

Approximately 1,500 visits occur annually on the Continental Divide National Scenic Trail. Every year a few hardy souls pass through the planning area, traversing the entire trail from Canada to Mexico, but most visitors are casual sightseers, hunters, or snowmobilers.

Much of the trail traverses the checkerboard. Access through private and state lands would be necessary for Canada-to-Mexico trail trekkers.

Shirley Mountains Caves

The Shirley Mountains contain a relatively unknown cave system; its extent has yet to be determined (see map 29). The mountains are part of an anticlinal formation of Laramide age with Precambrian rocks exposed in some areas. The Madison Limestone Formation is found here and contains all of the caves in Shirley Mountains (Hill, Sutherland, and Tierney 1976).

Cave Creek Cave is the only fully explored cave in the Shirley Mountains. There are reputed to be at least five other, smaller caves in the area (Land 1986), none as large as Cave Creek Cave, which begins at a large sinkhole and extends for about half a mile through twisty passages and fissures. *Caves of Wyoming* (Hill, Sutherland, and Tierney 1976) shows that there is an elevational difference of 165 feet from the entrance to the farthest reach of the cave.

There has been some vandalism (painting and carving) near the entrance of Cave Creek Cave; however, there are certain writings that date back to the late 1800s, when the cave was discovered by early spelunkers.

The Shirley Mountains provide excellent big game hunting. Deer and elk hunters converge on the Shirleys every fall. Pryor Flat, the only recreation site in the area, becomes extremely crowded during hunting seasons. To reduce this congestion, another recreation site is proposed to be located along First Ranch Creek. This would serve the needs of hunters and of cavers.

Because of the high recreation values of the Shirley Mountains, it is important to keep legal access through the mountains. In addition, the extent of the cave system and the locations of entrances are unknown. Opportunities exist to ensure access to cave entrances by adding parcels of land in this area to the public land base.

Recreation Developments

The six developed recreation sites in the planning area are listed in table 7, which also shows facilities at each site. Three sites, Bennett Peak, Corral Creek, and the Dugway, are located along the North Platte River. Bennett Peak recreation site is the only recreation facility in the planning area in which a fee is charged for camping. The current fee is $3 per night per site. The three other developed sites are Encampment River, Teton Reservoir, and Pryor Flat. Map 30 shows the locations of all sites.

TABLE 7

EXISTING RECREATION SITES

Name	Types of Facilities[1]	Annual Visitation[2]
Bennett Peak	B,C,P,T,W,$	1,500
Corral Creek	C,P,T	750
Dugway	B,C,P	2,100
Pryor Flat	C,T,W	850
Encampment River	C,P,T,Tr	1,500
Teton Reservoir	C,P,T	2,000

[1] B = boat launch, C = campsites, P = picnicking, T = toilets, Tr = trailhead, W = drinking water, $ = U.S. fee site

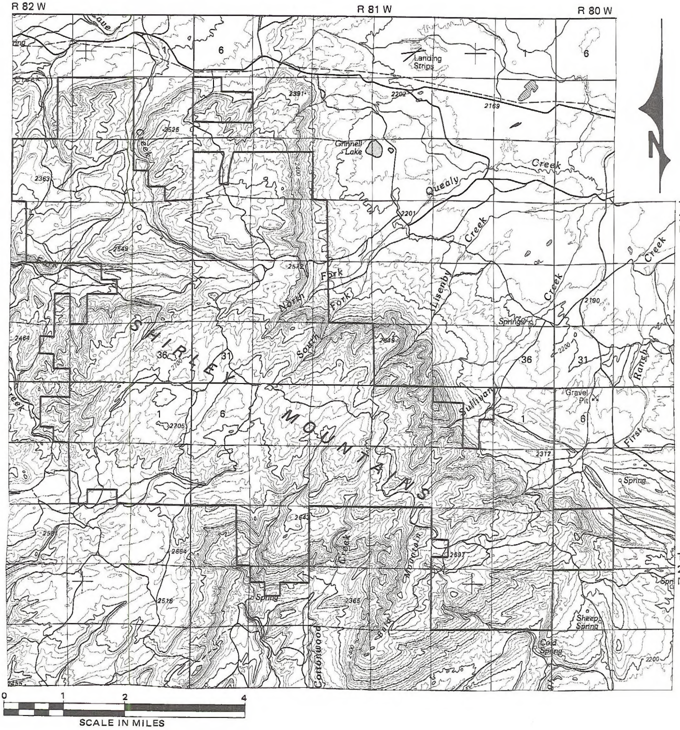
[2] Recorded in "visits." One visit equals one person entering an area for any part of one day.

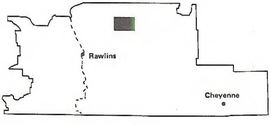
There are two undeveloped sites in the planning area, Nine Mile Hill and Big Creek (see map 30). Undeveloped sites are sites that have no facilities but have high recreation values and are consistently used by recreationists.

Dispersed Recreation

Big Game Hunting

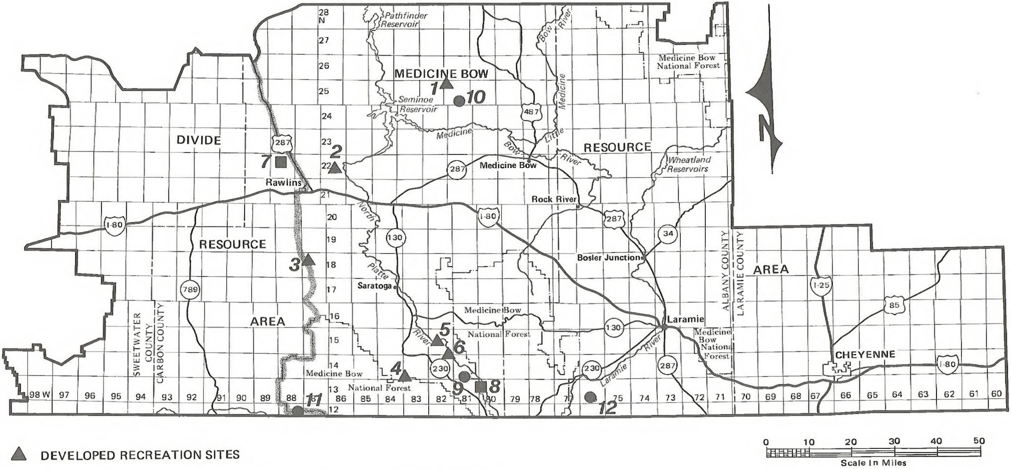
Big game hunting is the most extensive recreation activity occurring in the planning area. Hunters can choose from a variety of game animals—antelope, elk, deer, bighorn sheep, and black bear. The WGFD hunter day estimates for 1984 showed 47,300 hunter days for antelope, 39,000 hunter days for deer, and 11,700 hunter days for elk within the planning area. About 30





—— Management Area Boundary

Map 29
SHIRLEY MOUNTAIN CAVES
SPECIAL RECREATION MANAGEMENT AREA
Medicine Bow-Divide Resource Management Plan



▲ DEVELOPED RECREATION SITES

1	Pryor Flat
2	Dugway
3	Teton Reservoir
4	Encampment River
5	Bennett Peak
6	Corral Creek

■ UNDEVELOPED RECREATION SITES

7	Nine Mile Hill
8	Big Creek

● PROPOSED RECREATION SITES

9	Prospect Creek
10	Shirley Mountains
11	Battle Mountain
12	Jelm Mountain

Map 30

RECREATION DEVELOPMENTS

Medicine Bow-Divide Resource Management Plan

guides are permitted by BLM to operate on the public lands in the planning area; many more who are licensed by the WGFD operate only on private land.

The planning area is well known for its excellent antelope hunting, and the chance of bagging a trophy buck is quite high. For example, in the period from 1980 to 1982, 108 new entries for antelope were made in the Boone and Crockett record book, half of which came from Wyoming (Nesbitt 1984). Of the 54 entries from Wyoming, 23 were taken in Sweetwater and Carbon counties, which make up a substantial portion of the planning area.

Two items of special interest to hunters are the availability of hunting areas and the availability of camping facilities. Because of the intermingled landownership, there are certain areas where the quality of hunting opportunities is high but where there is no legal access to public lands. These areas include state land around the Ferris Mountains, Encampment River canyon, and Bennett Mountains, as well as public land on Elk Mountain, Miller Hill, Atlantic Rim, the Rawlins Uplift, and the foothills of the Ferris Mountains.

Access to other areas with high quality hunting opportunities is not ensured because those areas include state-owned or privately owned land. Their availability to hunters could be ensured only by consolidation of federal lands. These areas include state land around the Ferris Mountains, Encampment River Canyon, and Bennett Mountains.

The planning area contains few recreation sites in locations convenient to popular hunting areas. Two popular hunting areas near which there are no recreation sites are Battle Mountain and Jelm Mountain. Opportunities for big game hunting could be enhanced through development of facilities in these areas.

Fishing

Fishing is another recreation activity that occurs extensively in the planning area. The most sought-after game fish are rainbow, cutthroat, brown, and lake trout and walleye. The planning area contains approximately 170 miles of recreationally important and accessible streams. In addition, there are 14 important and accessible reservoirs and lakes and numerous beaver ponds that provide quality fishing opportunities.

It is estimated that 50,000 visits per year for fishing occur throughout the planning area. Among the most heavily used water resources are the North Platte River (already discussed in the section on SRMAs); Pathfinder, Seminoe, and Teton reservoirs; East Allen Lake; the Dune Ponds; the Encampment River; Savery Creek; North Fork of Savery Creek; and the Laramie River. While access to BLM-managed public land adjacent to these water bodies is generally adequate to facilitate recreation use, it is important that they be maintained under federal stewardship so that the continued availability of quality fishing opportunities is ensured.

Off-Road Vehicle Use

ORV use in the planning area generally is secondary to primary activities of hunting, fishing, and camping. The BLM is responsible for designating all BLM-managed public land as either open, limited, or closed to ORV use, as described in chapter 1. Designations are used to meet public demand or needs, to protect resources and the safety of public land users, and to minimize conflicts among the various public land users.

The Dune Ponds dunes are an area of special concern for recreational ORV use. This area of about 150 acres consists of large sand dunes with no obstructions of human origin. It is a very popular spot for free play of three- and four-wheeled all-terrain vehicles. This is the only such feature in the planning area that is also close to a major population center (Rawlins). The area also is popular for fishing; this creates a conflict between ORV users and fishermen, who tend to seek a modicum of quiet and solitude. Some of the area is state land; thus, opportunities to manage conflicts are limited because of the lack of similar regulations on the state parcels.

SOIL, WATER, AND AIR RESOURCES

Soils

Data and Inventories

Soils data are baseline data on which most other BLM programs are or can be based. Soils data have been used as a basis for range sites, range improvements, and wildlife habitat sites as well as for determining reclamation practices for surface disturbance due to mineral development. Soils data have more recently been used to locate sources of gravel and to determine the suitability of areas for use as water disposal pits for water produced from gas wells.

Soils in the planning area are variable. They are shallow to deep and fine to coarse textured, and they vary in salt content, organic matter content, and parent material.

Soils in the planning area have been inventoried at "order 3" or "order 4" levels. These inventories locate individual soils or groups of soils as they occur on the landscape. The order 3 inventory is more specific than the order 4 and is more suitable for use in land management decisions. An order 3 inventory has been conducted on most of the planning area; the Seven Lakes area has been inventoried at order 4.

Some of the areas with checkerboard landownership patterns have not been inventoried, nor have some "blocked" areas of private lands. The Soil Conservation Service (SCS) is now conducting a soil survey in Albany and Laramie counties. Recent requests for soils information in the Seven Lakes area may warrant a more detailed order 3 inventory in the future.

Broad generalizations pertaining to soil productivity, soil permeability and infiltration, soil stability and strength, and soil erosion can be made about soils in the planning area. Map 31 delineates these broad areas, which are differentiated by the amount of precipitation, elevation, soil temperature, and soil parent material.

Soil Productivity

Soil productivity is the most important soil value in the planning area. It determines livestock stocking rates through the amount of vegetation produced, dictates the kinds of plant communities on which wildlife habitat is based, and determines reclamation potential on areas of surface disturbance. Range improvement projects such as burning, spraying, and plowing and seeding are determined by amount of vegetation being produced and the potential amount that can be produced.

Soil characteristics and environmental factors that affect soil productivity are organic matter content, salt content, amount of precipitation, soil temperature, wind speed, aspect, soil depth, and soil parent material.

Soil productivity is naturally low throughout the planning area. Map unit A (see map 31) has the lowest productivity overall, and map units C and F have the highest productivity. Map units B, D, and E are intermediate in production. The main factor determining this production variability is the amount of precipitation. Map unit A receives the least precipitation; map unit C the most. The more precipitation, the more vegetative cover.

Vegetative cover adds more organic matter to the soil. Organic matter provides nutrients for plants, stores more moisture, and improves soil structure, all of which promote vegetative growth. Map units C and F have many soils with thicker, darker surface horizons, indicating more organic matter content. This thicker, darker surface can be attributed to more vegetation in these areas and to colder soil temperatures in map unit C. Cold temperatures slow the decay of organic material, allowing more organic material to accumulate.

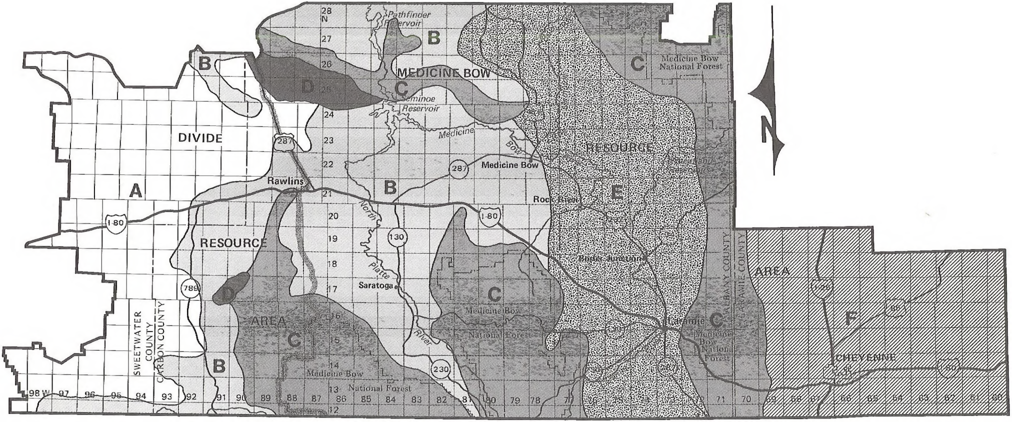
Map unit F has warmer soil temperatures and longer growing season, allowing more vegetation to grow for a longer period and plants to produce more vegetative material. There also tends to be more grass production in map unit E, which produces more plant material than the grass shrub vegetation. Map units A, B, D, and E do not have the dark surface layer, but map units B, D, and E contain more organic matter than map unit A.

The more precipitation, the more moisture available to leach salts out of the rooting zone. Salts in the soil stress plants by making water uptake more difficult. The most leaching occurs in map units C, D, and F, and the least in map unit A. Map units B and E have soils that are sufficiently leached to produce good vegetative cover.

Soils in map unit A are derived from marine shales, which gives them a high salt content. Precipitation is not sufficient to leach salts below the rooting zone. These shales also produce finer-textured soils, which have a low infiltration rate. This further inhibits leaching. Map units B, C, D, E, and F are derived from parent materials lower in salt and coarser in texture. There are fewer salts to be leached, and the coarser textures increase the infiltration rate. Map unit D contains sandy soils with the smallest amount of salts and the highest infiltration rates. Moisture infiltrates deeper, allowing more deeply rooted vegetation to become established. Map unit E has many broad, flat areas that are windswept. The wind increases evapotranspiration, which makes overall plant productivity less than in map unit B.

Southern and western aspects are more windswept than northern and eastern aspects, and they receive more solar radiation, which evaporates more moisture. Besides being less windswept and receiving less solar radiation, northern and eastern aspects receive more snowpack, so that they have more moisture available for plant growth.

In all map units, soil productivity is highest adjacent to springs and natural drainages that produce flowing water frequently throughout the



A	Basin Soils of the 7-9 inch Precipitation Zone
B	Mid-elevation Soils of the 10-14 inch Precipitation Zone, West
C	High-elevation Soils of the 15-19 inch Precipitation Zone
D	Stabilized Dunes of the 10-14 inch Precipitation Zone
E	Mid-elevation Soils of the 10-14 inch Precipitation Zone, East
F	Lower-elevation Soils of the 15-17 inch Precipitation Zone, Warm

Map 31

GENERAL SOILS MAP

Medicine Bow-Divide Resource Management Plan

year. This additional water flushes salts out of the soil and provides more moisture for plant growth, reducing the stressful effect of salts on plants.

Soils that are less than 20 inches over bedrock or other root-restricting layers are present in all map units, with the least in map unit D and the most in map unit C. These shallow soils, which have a lower soil productivity, occur on steeper topography. Water tends to run off these areas faster than it infiltrates. These soils also have a lower water-holding capacity, which makes less stored water available for plant growth.

Soils throughout the planning area tend to contain adequate nitrogen and potassium for plant growth. Phosphorous tends to be limited. Improper reclamation techniques on surface-disturbed areas could result in less than adequate amounts of all nutrients.

Soil crusting also affects soil productivity. It reduces infiltration rates, thereby limiting the depth to which salts are leached and the depth to which roots can penetrate. Soils in map unit A are most susceptible to forming a surface crust. The sparse vegetative cover exposes more soil to raindrop impact. Raindrop impact has a compacting effect on the soil surfaceit breaks down soil surface structure into a massive condition. This reduces the amount of large pore space available for infiltration. The high sodium content of many soils in this map unit disperses soil particles, which results in a naturally poor soil surface structure. Rainfall impact more easily destroys the existing soil structure. Soils in map units B, C, E, and F also can undergo surface crusting if vegetative cover deteriorates.

Soil Permeability

Soil permeability affects such land uses as reservoirs, water disposal pits, sanitary landfills, and sewage lagoons. Soils for these uses need to be basically impermeable or permeable enough to filter out impurities before water reaches groundwater and surface waters.

Map unit A contains many soils that are fine in texture with low permeability. Some areas within map unit A are moderately permeable, and these act as good filters or can be compacted to become less permeable. Map units B, C, E, and F contain soils that are dominantly moderately permeable. They can be good filters, or they may be compacted to become less permeable. Map unit D soils are highly permeable, they are not good filters and cannot be compacted sufficiently to reduce permeability.

All map units contain soils with bedrock within 60 inches. Often the underlying bedrock is fractured, making it highly permeable and a poor filter. These conditions must be considered when reservoirs are constructed.

Seams of gypsum occur in some shale bedrock, especially in map unit A. Gypsum is highly soluble and can cause piping (formation of tubular cavities) through soils and bedrock with little filtering effect. The soils with high clay content in map unit A are subject to cracking upon wetting and drying. Pipes (tubular cavities) also can develop as water flows through these cracks.

Soils adjacent to major drainages in map units A, B, C, E, and F tend to be stratified, with layers of finer and coarser soil material. When water reaches the coarser layers, it tends to flow through them, causing reservoirs or water holding ponds to seep. Most of these coarser layers are not good filters.

Soil Strength and Stability

Soil strength has important implications for the construction and maintenance of facilities. Soils with low strength are subject to deformation. Drill pads and roads become rutted and slippery when wet, making travel difficult. Soil strength also affects building foundation stability.

Soils made up of dominantly one particle size tend to exhibit lower strength, while varying proportions of different particle sizes exhibit greater strength. Soils with different particle sizes better fill in voids of varying sizes, causing more friction among particles. Soils with dominantly one particle size also have voids or pore spaces of dominantly one size, with no other particle sizes available to fill these spaces.

Map unit A contains many soils with low strength. Textures are mainly clayey or silty, making compaction difficult. Deformation upon wetting under a load is a problem.

Soils in map units B, C, E, and F have moderate strength. Compaction may be possible to increase strength and keep deformation under a load to a minimum. Textures are typically loamy.

Soils in map unit D and scattered areas in map unit A tend to be sandy. The sands have very few fine particles to act as a binder and to fill in smaller voids. These soils are loose and subject to displacement under dry conditions.

Areas susceptible to slumping, sliding, and soil creep impose hazards to reservoirs, roads, and buildings for obvious reasons (see map 32). Soil stability problems are greatest in map unit C. This map unit receives the most precipitation, mainly in the form of snow. Snow tends to drift on leeward steep slopes. When the snow melts, it saturates the soil, increasing soil weight. This can cause mass wasting. Soil saturation and the resulting mass wasting also occur on slopes where springs emerge. Soil stability problems also occur in map units A, B, E, and F, but to a lesser extent.

Soil Erosion

Most locations in the planning area are undergoing natural rates of erosion because of the relatively good range condition. Poor ecological range condition usually coincides with accelerated erosion.

Accelerated rates of erosion occur mainly in localized areas in the planning area. These include areas of surface disturbance and overgrazing in some drainages, especially riparian areas where livestock tend to congregate. Reduced vegetation along drainages makes stream banks less stable, causing stream downcutting and gullying. Three watersheds identified as undergoing accelerated stream bank erosion are Muddy Creek, Sage Creek, and Second and Third Sand Creeks.

Natural rates of erosion vary within the planning area. Map unit A exhibits the highest natural rates. This is caused by naturally low vegetative cover, soil crusting, low organic matter content, and soft shales, which are susceptible to erosion. The dispersal property of sodium makes soil particles more easily detached by wind and water. Scattered areas of sand dunes are easily eroded by wind when vegetation is removed.

Map units B, E, and F have lower natural rates of erosion by water, and map unit D has the least. More vegetative cover, organic matter content, and lower sodium contents make soils more erosion-resistant in these areas. The steeper slopes in map units B, C, E, and F are better protected because bedrock is more erosion-resistant and the harder rock fragments associated with bedrock cover the soil surface, protecting it against erosion. Snowpack areas in map unit C are more susceptible to mass wasting, as discussed in the "Soil Stability" section.

Map unit D is more susceptible to wind erosion, as evidenced by scattered areas of blowouts. This unit is fairly well protected by a good vegetative cover, but it could become actively eroding if vegetative cover was reduced. The other map units also undergo wind erosion when vegetation is removed, but at lower rates.

Water Resources

Surface Water

Parts of three major drainages are in the planning area: the Great Divide Basin, the Little Snake River drainage, and the North and South Platte River drainage (see map 33). The Little Snake drainage forms part of the Colorado River system, the North Platte and South Platte are part of the Missouri River system, and the Great Divide Basin is a closed drainage from which no surface water escapes.

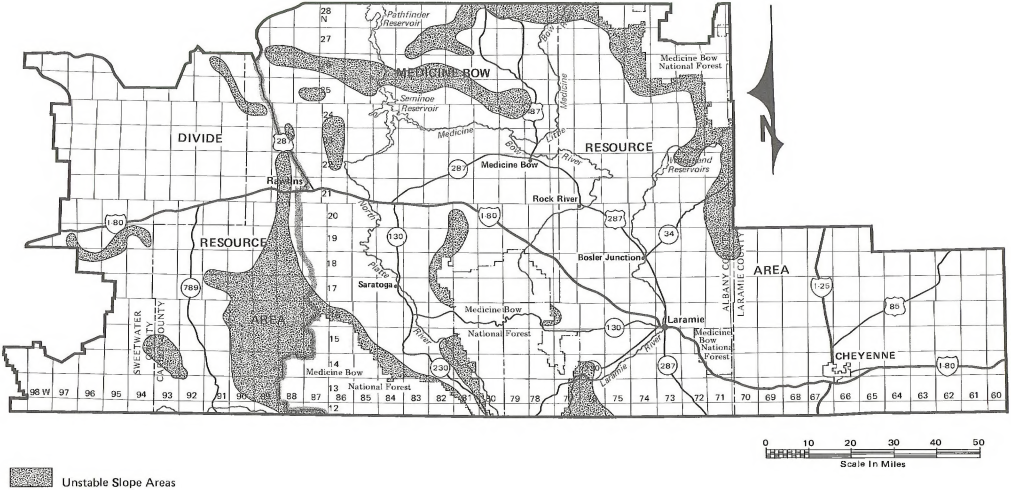
Uses

Surface water in the planning area is used mainly for livestock and wildlife watering. Seminoe and Pathfinder reservoirs on the North Platte River were constructed to control water for irrigation purposes. Water flowing from Kortes Reservoir on the North Platte River is used for electrical power generation. The Laramie River and Wheatland Reservoir No. 2 also are used for irrigation, and smaller perennial streams are used for irrigation on a smaller scale.

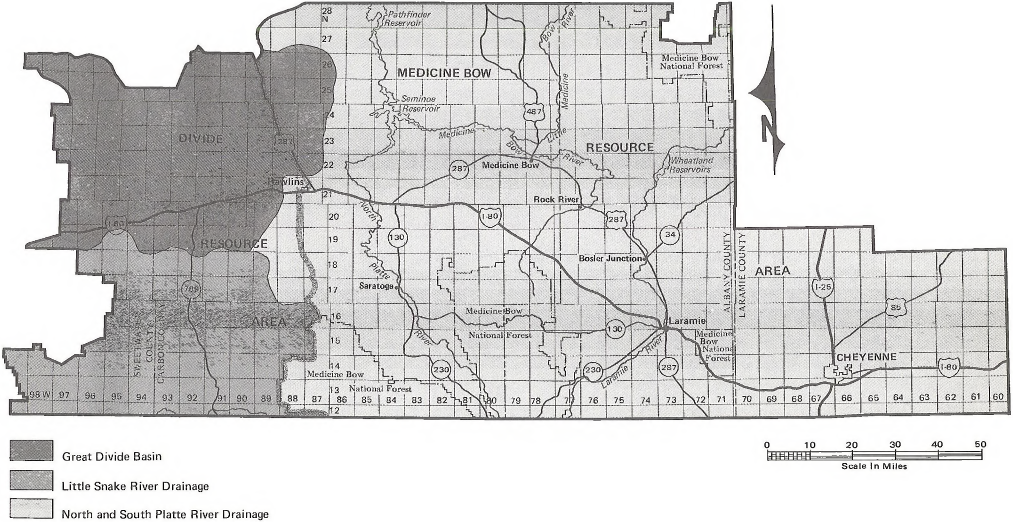
Most communities near major rivers such as the North Platte, Little Snake, and Laramie rivers obtain some or all of their domestic water supplies from these surface waters.

Watersheds in the planning area consist almost entirely of rangeland rather than cropland or urban-industrial land. Most of the planning area is "water deficit" land with few perennial streams and mostly intermittent runoff. Runoff originates from both spring snowmelt and intense rainstorms. Most of the area's perennial streams originate above 8,000 feet in the mountains, in water surplus zones where snowmelt is the major source of runoff. Because most of the BLM-managed public land in the planning area is water deficit, semiarid land, the water contribution from public lands to the major streams in the planning area is not great. Most precipitation on BLM-administered public land is lost through evapotranspiration and sublimation rather than leaving the land through runoff or entering groundwater aquifers.

Natural waters that provide dependable year-round watering for livestock and wildlife are poorly distributed, especially in the Great Divide Basin. As a result, hundreds of livestock ponds and other water developments have been



Map 32
AREAS WHERE UNSTABLE SLOPES OCCUR ON PUBLIC LANDS
Medicine Bow-Divide Resource Management Plan



Map 33
DRAINAGE BASINS
Medicine Bow-Divide Resource Managment Plan

constructed in the planning area. These developments provide a significant percentage of the total water available for livestock and wildlife. Evaporation losses from these developments are large, far exceeding the amount used by livestock and wildlife combined. Natural springs are important sources of water in the area. Nearly every water source in the planning area is open to and used by livestock and wildlife.

Quantity

Most of the planning area is semiarid and produces little runoff. Runoff yields range from 0.5 inch to 1 inch in most of the planning area, to 5 inches in the high elevations. Most drainages in the planning area are ephemeral and flow only during spring runoff and during intense summer thunderstorms. The larger perennial drainages such as the North Platte River, the Little Snake River, the Encampment River, and the Medicine Bow River show a great deal of seasonal change in flow. For example, the North Platte River at the gaging station north of Sinclair shows a high instantaneous stream flow of 6,137 cubic feet per second (cfs) to a low flow of 186 cfs during dry periods.

Quality

Table 8 presents the water quality standards of the state of Wyoming. Maps 34, 35, and 36 show point and nonpoint sources of pollution. Table 9 shows where point source pollutants originate through state-permitted water discharges. Other permitted discharges in the planning area are not affecting water quality at present.

TABLE 8

WATER QUALITY PARAMETERS

		Underground Water Class		
		I	II	III
Use Suitability Constituent or Parameter	**Special (A) Fish/Aquatic Life Concentration[1]**	**Domestic Concentration[1]**	**Agriculture Concentration[1]**	**Livestock Concentration[1]**
Aluminum (Al)	0.10000	—	5.000	5.00000
Ammonia (NH_3)	0.02000[2]	0.500[9]	—	—
Arsenic (As)	0.05000	0.050	0.100	0.20000
Barium (Ba)	5.00000	1.000	—	—
Beryllium (Be)	0.011-1.100[3]	—	0.100	—
Boron (B)	—	0.750	0.750	5.00000
Cadmium (Cd)	0.0004-0.0150[3]	0.010	0.010	0.05000
Chloride (Cl)	—	250.000	100.000	2,000.00000
Chromium (Cr)	0.05000	0.050	0.100	0.05000
Cobalt (Co)	—	—	0.050	1.00000
Copper (Cu)	0.01-0.04[3]	1.000	0.200	0.50000
Cyanide (CN)	0.00500	0.200	—	—
Fluoride (F)	—	1.4-2.4[8]	—	—
Hydrogen Sulfide (H_2S)	0.00200[4]	0.050	—	—
Iron (Fe)	0.50000	0.300	5.000	—
Lead (Pb)	0.004-0.150[3]	0.050	5.000	0.10000
Lithium (Li)	—	—	2.500	—
Manganese (Mn)	1.00000	0.050	0.200	—
Mercury (Hg)	0.00005	0.002	—	0.00005
Nickel (Ni)	0.05-0.40[3]	—	0.200	—
Nitrate (NO_3-N)	—	10.000	—	—
Nitrate (NO_2-N)	—	1.000	—	10.00000
(NO_3+NO_2)-N	—	—	—	100.00000
Oil & Grease	Virtually free	Virtually free	10.000	10.00000
Phenol	0.00100	0.001	—	—
Selenium (Se)	0.05000	0.010	0.020	0.05000
Silver (Ag)	0.00010-0.00025[3]	0.050	—	—
Sulfate (SO_4)	—	250.000	200.000	3,000.00000
Total Dissolved Solids (TDS)	500.0[4]-1,000.0[5]-2,000.0[2]	500.000	2,000.000	5,000.00000
Uranium (U)	0.03-1.40[2]	5.000	5.000	5.00000
Vanadium (V)	—	—	0.100	0.10000
Zinc (Zn)	0.05-0.60[3]	5.000	2.000	25.00000

TABLE 8 (Continued)

WATER QUALITY PARAMETERS

		Underground Water Class		
		I	II	III
Use Suitability Constituent or Parameter	**Special (A) Fish/Aquatic Life Concentration[1]**	**Domestic Concentration[1]**	**Agriculture Concentration[1]**	**Livestock Concentration[1]**
pH	6.5s.u.-9.0s.u.	6.5-9.0s.u.	4.5-9.0s.u.	6.5-8.5s.u.
SAR	—	—	8.000	—
RSC	—	—	1.250 meq/l	—
Combined Total Radium 226 and Radium 228[10]	5pCi/l	5pCi/l	5pCi/l	5pCi/l
Total Strontium 90	8pCi/l	8pCi/l	8pCi/l	8pCi/l
Gross alpha particle Radioactivity (including Radium 226 but excluding Radon and Uranium)[10]	15pCi/l	15pCi/l	15pCi/l	15pCi/l

SOURCE: Wyoming Department of Environmental Quality, *Water Quality Rules and Regulations: Chapter VIII: Quality Standards for Wyoming Groundwaters,* (Cheyenne, WY: n.d.)

ABBREVIATIONS: meq/l - milliequivalents per liter; pCi/l = picocuries per liter; RSC - Residual sodium carbonate; s.u. - standard unit; SAR - Sodium absorption ratio.

[1] In milligrams per liter, unless otherwise indicated.

[2] Un-ionized ammonia: When ammonia dissolves in water, some of the ammonia reacts with water to form ammonium ions. A chemical equilibrium is established which contains un-ionized ammonia (NH_3), ionized ammonia (NH_4+) and hydroxide ions (OH). The toxicity of aqueous solutions of ammonia is attributed to NH_3; therefore, the standard is for un-ionized ammonia. (Note: 0.02 mg/l NH_3 is equivalent to 0.016 NH_3 as N.)

[3] Dependent on hardness: The toxicity of metals in natural waters varies with the hardness of the water; generally, the limiting concentration is greater in hard water than in soft water.

[4] Undissociated H_2S: The toxicity of sulfides derives primarily from H_2S, rather than from the dissociated (HS) or (S) ions; therefore, the standard is for the toxic undissociated H_2S.

[5] Egg hatching.

[6] Fish rearing.

[7] Fish and aquatic life.

[8] Dependent on the annual average of the maximum daily air temperature: 1.4milligrams per liter (mg/l) corresponds with a temperature range of 26.3 to 32.5 degrees C, and 2.4 mg/l corresponds with a temperature of 12.0 degrees C (53.7 degrees F) and below.

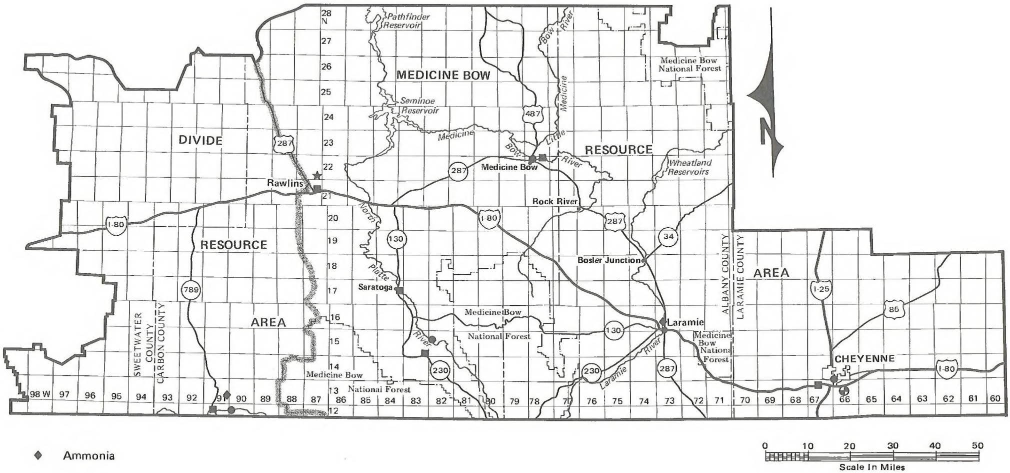
[9] Total ammonia-nitrogen.

[10] Requirements and procedures for the measurement and analysis of gross alpha particle activity, Radium 226 and Radium 228 shall be the same as requirements and procedures of the U.S. Environmental Protection Agency, National Interim Primary Drinking Water Regulations, EPA-570/9-76-003, effective June 24, 1977.

The state of Wyoming priority streams in the planning area and the problems and impairment associated with them are summarized in the Soils, Water, and Air appendix. The above-mentioned tables and maps were obtained from the *Wyoming 1986 Water Quality Assessment* (Wyo. DEQ 1986). The following overview of water quality for the three major drainage basins in the planning area also was taken mainly from the above reference, by the Wyoming Department of Environmental Quality (DEQ). The river basins are shown on map 33.

North and South Platte River Basin. The DEQ report describes the North and South Platte River conditions as follows:

> Class I waters in the drainage]basin[are the main stem of the North Platte River from the mouth of Sage Creek upstream to the Colorado state line and from the headwaters of Pathfinder Reservoir upstream to Kortes Dam . . . and the Encampment River from the U.S. Forest Service boundary upstream to the Colorado state line. The Wyoming Water Quality Standards require that these waters be maintained at their existing quality. Some degradation of the North Platte River above Sage Creek has occurred from municipal dischargers (Saratoga), but occurs mostly from rangeland runoff and natural geologic erosion. . . .



◆ Ammonia

■ Bacteria

● Dissolved Oxygen

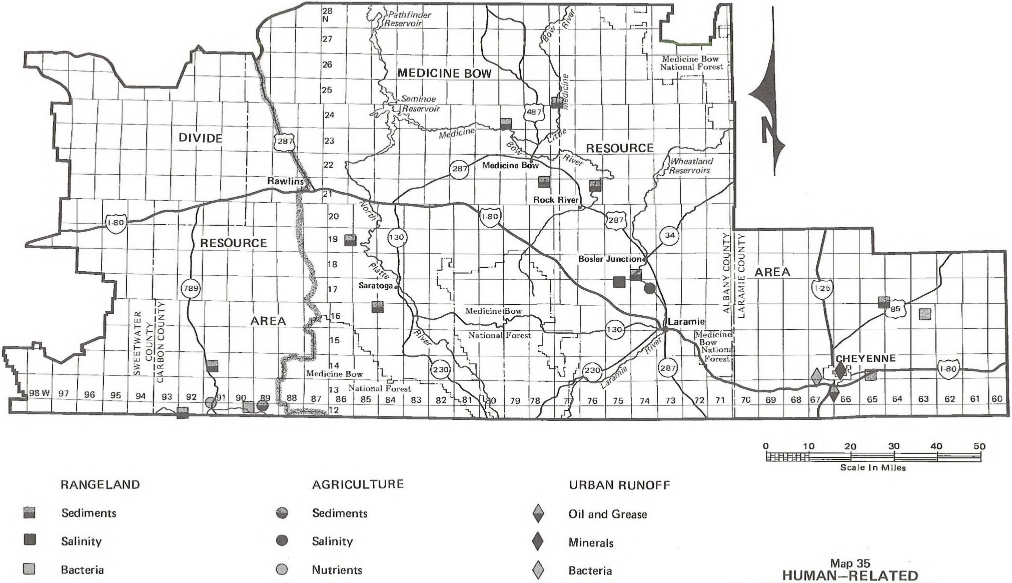
★ Oil and Grease

⊕ Suspended Solids

Map 34

POINT SOURCE WATER POLLUTION

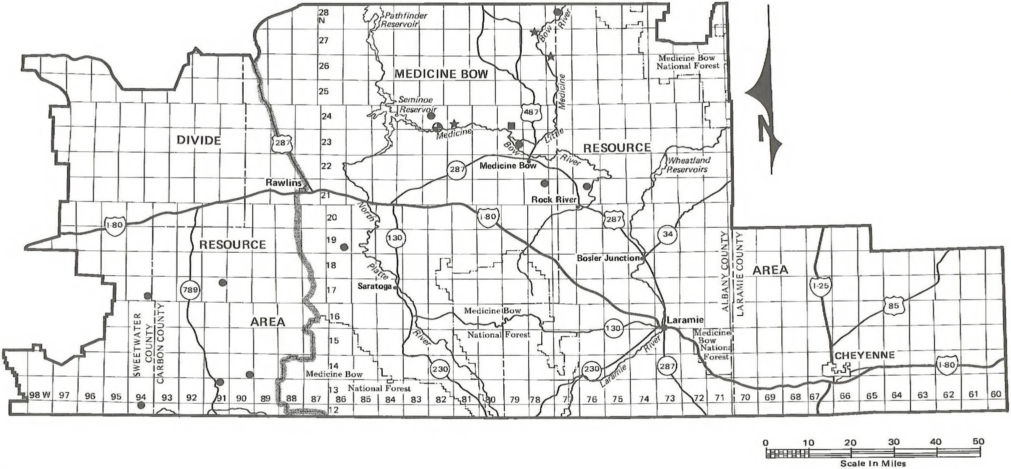
Medicine Bow-Divide Resource Management Plan



Map 35

HUMAN–RELATED NONPOINT POLLUTION

Medicine Bow-Divide Resource Management Plan



● Sediments

★ Radioactivity

⊕ Nutrients

■ Salinity

Map 36

NONPOINT POLLUTION, NATURAL BACKGROUND

Medicine Bow-Divide Resource Management Plan

TABLE 9

DISCHARGE PERMITS

Discharger	Type of Industry	Stream (Class)	Permit Number	Treatment Method	Discharge MGD[1] Max.	Discharge MGD[1] Avg.	Meeting Secondary Standards	Permit Violations
Municipal Discharge Permits in the North Platte River Basin								
Town of Encampment		Encampment River (II)	0020591 (Non Deg.)	Lagoon	0.21	0.12	No	Fecal Coliform, BOD[2]
Town of Sinclair		Sugar Creek (IV)	0020397 (Non Deg.)	Imhoff Tank	0.16	0.13	No	Fecal Coliform, BOD[2]
Town of Fort Laramie		North Platte River (II)	0020567 (Non Deg.)	Lagoon	0.01	0.00	No	Fecal Coliform
Town of Hanna		Big Ditch (IV)	0020745 (Non Deg.)	Aerated Lagoon	0.04	0.01	No	Fecal Coliform
City of Laramie		Laramie River (II)	0022209 (Non Deg.)	Aerated Lagoon	7.50	4.10	Yes	Ammonia
Industrial Process Discharge Permits in the North Platte River Basin								
Cheyenne Board of Public Utilities	Water Resources Development Project	Hog Park Creek (II)	0031429	Settling Ponds	N/A	N/A	No	Total Suspended Solids
Water and Sewer Districts Discharge Permits in the South Platte River Basin								
South Cheyenne W&SD		Crow Creek (IV)	0021725	Activated Sludge Package Plant	1.50	0.60	No	Fecal Coliform, BOD,[2] Total Suspended Solids

TABLE 9 (Continued)

DISCHARGE PERMITS

Discharger	Type of Industry	Stream (Class)	Permit Number	Treatment Method	Discharge MGD[1] Max.	Discharge MGD[1] Avg.	Meeting Secondary Standards	Permit Violations
Municipal Discharge Permits in the Little Snake River Basin								
Town of Baggs		Little Snake River (II)	0022880 (Non Deg.)	Lagoon	0.13	0.07	No	Fecal Coliform, BOD,[2] Ammonia
Industrial Process Discharge Permits in the Little Snake River Basin								
Cheyenne Board of Public Utilities	Water Development Project	Many	0031411		N/A	N/A	No	Turbidity
Andover Minerals Corporation	Copper Mine	Haggerty Creek (II)	0023523	None	0.10 (estimated)	0.06	No	Copper

SOURCE: Wyoming Department of Environmental Quality, Water Quality Division, *Wyoming 1986 Water Quality Assessment*, (Cheyenne, WY: 1986).

[1] MGD = Millions of gallons per day

[2] BOD - Biochemical oxygen demand

> The majority of industrial and commercial dischargers are in compliance with their discharge permits. However, some commercial systems do periodically go out of compliance.

Water quality degradation from natural causes also is discussed in the DEQ report, which indicates that water quality in the North and South Platte Basins is degraded by natural processes, primarily by the erosion of exposed geologic formations and stream channels. Some of the major problems are sedimentation, salinity, and alpha particle standard exceedances. The Difficulty and Allen lakes and Little Medicine Bow River watershed in the Laramie Plains-Medicine Bow area are affected by stream bank erosion.

The DEQ report also discusses water quality in the Saratoga Valley.

> In the Saratoga Valley area the most common source of turbidity and sediments is stream bank erosion. The following watersheds have active stream bank erosion: Encampment River, Brush, Cow, Calf and Sage creeks. The Sage Creek watershed has severe sheet erosion over a large part of the drainage. Sage Creek joins the North Platte River above the Ft. Steele bridge [between Fort Steele and Saratoga], contributing heavy loads of collodial silt from eroding bentonite deposits, most of which are deposited in the Seminoe Reservoir. The North Platte River is noticeably degraded at this point (U.S. Department of Agriculture 1979, 1:6-12).

Sediment carried by Sage Creek to the reservoir also comes from erosion-prone soils.

Livestock and wildlife also contribute to water problems.

> Grazing and foraging activities by livestock and wildlife lead to some limited fecal coliform problems. Peak coliform counts occur on the North Platte above Seminoe Reservoir during the winter. Grazing activities are the probable source of fecal coliform fluctuations on the Laramie River near Fort Laramie.

Abandoned and existing mined lands also contribute excessive sediment and other pollutants to Seminoe Reservoir and other surface waters. Hanna Draw, Big Ditch, and North Ditch show periodic violations in heavy metal concentrations.

Little Snake River Basin. Several factors affect the water quality in the Little Snake River Basin. The DEQ report continues as follows:

> The water quality in the Little Snake River Basin varies greatly. The streams in the Sierra Madre Mountains are very high quality. On the lowland areas, highly erosive soils, irrigation return flows and water diversions all impact water quality. . . .

Wastewater treatment facilities in Baggs currently are not meeting standards for biochemical oxygen demand (BOD) and fecal coliform. The Ferris Haggerty mine is discharging water high in copper content into Battle Creek, a tributary of the Little Snake River. The Cheyenne "Stage II" project is causing turbidity violations in tributaries of the Little Snake River.

The DEQ report also describes pollution sources in the Little Snake River Basin:

> The primary nonpoint source problems in the Little Snake River Basin are geologic erosion, frequently exacerbated by human land users, and irrigation return flows to the Little Snake River in late summer. . . .
>
> Natural geologic erosion is common in the Sand Creek and Muddy Creek drainages. The high erosion rates are somewhat increased by livestock grazing and poor road construction practices. The North Barrel Springs Draw, Battle Creek and Roaring Fork watersheds have gully erosion, which has been accelerated by improper road building on rangelands (U.S. Department of Agriculture 1978, v-9).

Great Divide Basin. The Great Divide Basin has few water quality problems, according to the DEQ report.

> There are no significant water quality problems in the basin. All water sources are Class IV and only flow in response to rainfall or snowmelt . . . . The municipal treatment facility of Bairoil does not discharge. The primary quality problem in the basin is the lack of water. A cooperative effort is underway to mitigate this problem.

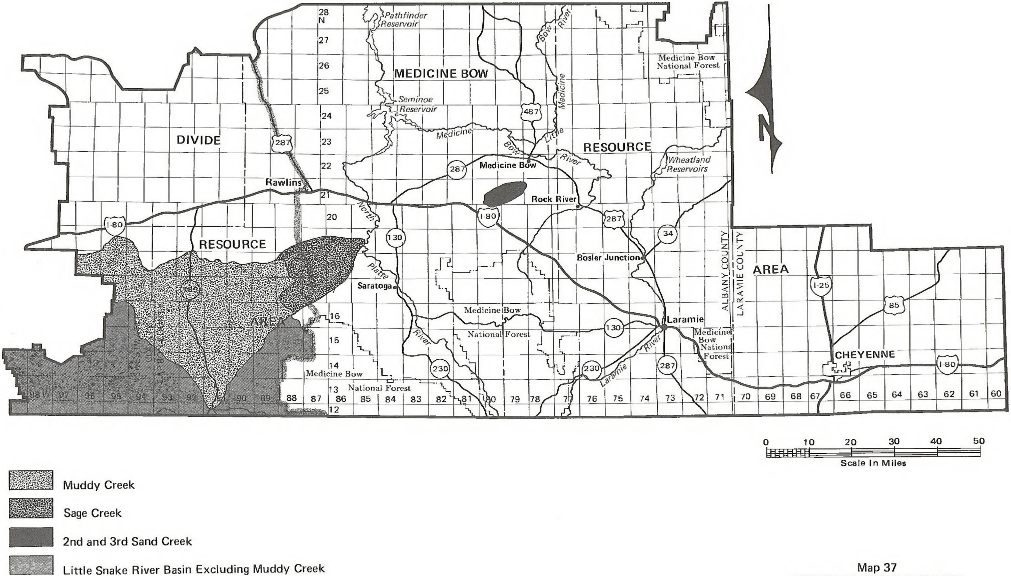
Areas Needing Special Management

The Rawlins District has identified three watersheds and one general area as requiring special management. The Muddy Creek drainage, the Sage Creek drainage, and the Second and Third Sand Creeks drainage are the watersheds; the southwest corner of the planning area is the general area requiring special management (see map 37).

The Muddy Creek drainage and the southwest portion of the planning area are in the Colorado River Basin. These areas are thought to add unacceptable amounts of sediment to the Little Snake River, as well as salt. Causes of this are mainly natural, but the problem has been increased by surface-disturbing activities. A reduction in sediment loading also would result in reduced salt loading. A direct relationship exists between sediment concentrations and salt concentrations in streams. It is worth $62 per ton of salt, downstream, to keep salt in place (Jackson, Janes, and Van Haveren 1985).

The Sage Creek drainage is thought to add considerable amounts of sediment and salt to the North Platte River. This is evidenced by the fact that the North Platte River changes from a Class I to Class II stream below its confluence with Sage Creek. The Sage Creek drainage also is a domestic water supply for Rawlins.

The Second and Third Sand Creeks drainage is thought to add considerable amounts of



Map 37

CRITICAL WATERSHEDS

Medicine Bow-Divide Resource Management Plan

sediment to the Medicine Bow River, which is a Class II stream. A reduction in sediment loading would be beneficial to the fisheries potential of the Medicine Bow River. A generalized watershed plan has been written to mitigate the sediment problem in this drainage.

Groundwater

Systems

Most groundwater information presented here was obtained from the *Wyoming 1986 Water Quality Assessment* prepared by the Water Quality Division of the Wyoming DEQ.

Map 38 depicts structural groundwater basin systems in the planning area. There are three structural basins in the planning area: the Great Divide and Washakie; Hanna, Shirley, and Laramie; and Denver-Julesburg basin systems. The Great Divide Basin system is primarily a structural basin aquifer. The Hanna, Shirley, and Laramie and Denver-Julesburg Basin systems are primarily high plains aquifers. Small areas of major alluvial aquifers also occur in the Denver-Julesburg Basin system. There are carbonate and sandstone aquifers in small areas in the Hanna, Shirley, and Laramie Basin system. The occurrence of these aquifers is shown on map 39.

Uses

The following discussion of groundwater use is based on statewide data because no specific information was available for this planning area.

Groundwater supplies approximately 90% of rural domestic water. Most of the major population centers in the planning area obtain all or part of their domestic water supply from surface water; therefore, more domestic water is obtained from surface water than from groundwater.

Groundwater is a more dependable source of water for livestock and wildlife watering than surface water. Groundwater is obtained from developed wells and springs for this use.

The energy industry in Wyoming uses groundwater for power generation, oil recovery, and uranium mining and processing. The petroleum industry is the largest user of industrial groundwater in Wyoming it uses almost two-thirds of the total. The coal and uranium industries use the second and third largest amounts.

Groundwater is heavily used for irrigation in the Denver-Julesburg basin system; however, the North Platte River drainage supplies slightly more water for irrigation.

Occurrence and Quantity

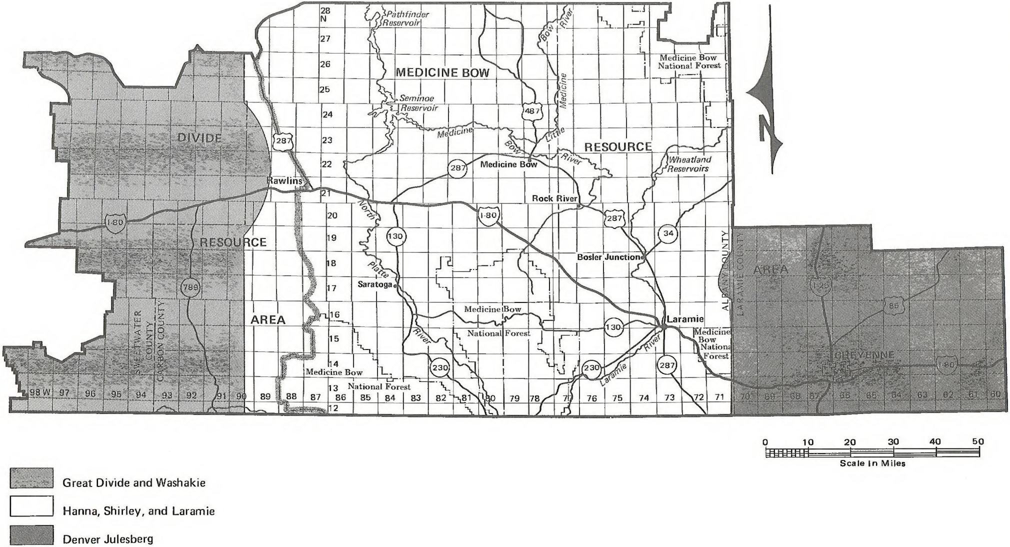
The following information is extracted from the *Wyoming 1986 Water Quality Assessment* (Wyo. DEQ 1986).

> Alluvial aquifers border most of the larger streams of Wyoming. . . . Actual or potential well yields exceed 100 gallons per minute (gal/min). . . . However, many other alluvial aquifers along smaller streams in the plains and mountains and, in places, lithologically similar glacial deposits provide important local sources of ground water.
>
> The High Plains aquifer underlies the southeastern part of Wyoming. . . . Well yields commonly are from 150 to 800 gal/min, but some yields exceed 2,000 gal/min. . . . In most of the area south of the Sweetwater River, the saturated thickness ranges from about 200 to 3,000 feet.
>
> Structural basin aquifers underlie most of the major structural basins of Wyoming. The structural basin aquifers are commonly composed of lenticular sandstone, shale, and coal beds. . . . Although this aquifer is very extensive and can be more than 5,000 feet thick, it generally yields less than 50 gal/min.
>
> Coarser materials, such as conglomerate and arkose, present near the margins of some basins yield more than 1,000 gal/min. . . .
>
> The carbonate and sandstone aquifers outcrop in small areas of the state where the land is steep and sparsely populated. The rocks generally dip steeply toward the basins and, within a few miles of these outcrops, are too deep to be economically accessible for most potential users. These rocks are characterized by secondary permeability (fractures, joints, and solution cavities). The carbonate and sandstone aquifer is the source of water for many of the larger springs in Wyoming. . . .
>
> Very high yields (over 10,000 GPM) are obtainable from the Mississippian carbonate beds, commonly known as the Madison or Pahasapa Limestone. The high yields from these beds are attributable to secondary porosity due to fractures and solution cavities. . . .
>
> Approximately half of the state is overlying Early Tertiary through Permian bedrock formations and very low well yields are normal in these areas. Often entirely screened wells up to several hundred feet deep must be drilled to provide sufficient water for domestic use.

Quality

Much of the following information on groundwater quality was extracted from the *Wyoming 1986 Water Quality Assessment* (Wyo. DEQ 1986).

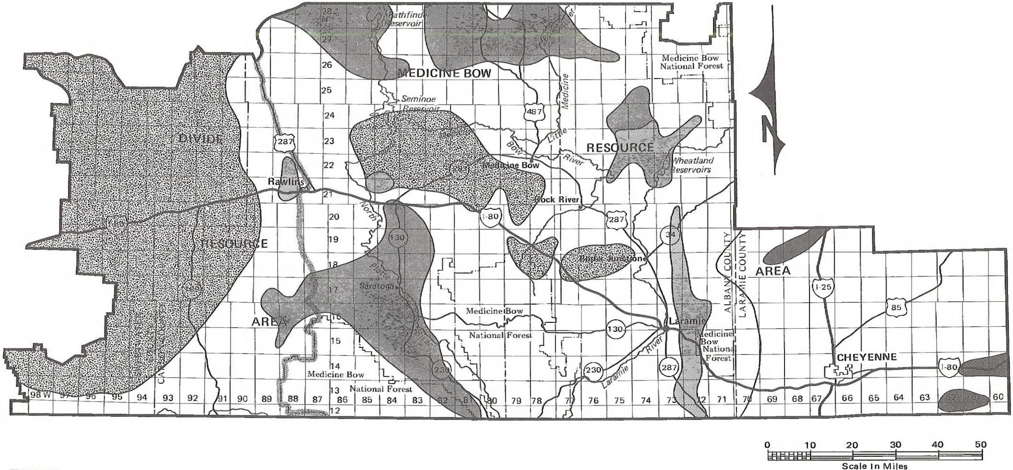
> In general, the bedrock aquifers produce better quality water near their outcrop/recharge areas. The quality degrades as the ground water circulates basinward. As the depth increases, the water absorbs more and more dissolved constituents.



Map 38

GROUNDWATER SYSTEMS

Medicine Bow-Divide Resource Management Plan



- ▨ Structural Basin Aquifers
- ▨ Carbonate and Sandstone Aquifer
- ▨ High Plains Aquifer
- ■ Major Alluvial Aquifer
- ☐ Not A Principal Aquifer

Map 39
PRINCIPAL AQUIFERS
Medicine Bow-Divide Resource Management Plan

> Bedrock aquifers . . . are often bounded by an upper aquitard or confining layer. This layer of impermeable material tends to greatly slow the movement of contaminants from the surface into the aquifer. The bedrock aquifers are most vulnerable at their outcrop/recharge areas where they are exposed to the surface. Pollutants can be introduced at the outcrop areas and, together with rainwater for example, percolate down to the saturated bedrock. At this point the aquifer is contaminated. Whether that pollutant will travel long distances along the aquifer gradient depends on factors such as the nature of the pollutant, ground water characteristics, and the nature of the host bedrock.

Alluvial groundwaters in the planning area generally are of fair to good quality and are heavily used for domestic consumption, livestock watering, or irrigation. They are generally unconfined and characteristically range in depth below the surface from a few feet to 100 feet. The average depth is less than 50 feet. Depending upon other factors such as the mineral makeup of the unconsolidated material, these aquifers can be highly vulnerable to pollution from surface sources.

High nitrate levels occur locally from nonpoint agricultural and municipal sources.

The DEQ report mentions other problems.

> . . . All basins have some wells showing levels of fluoride that exceed primary standards in at least one major aquifer. Selenium is also a fairly widespread problem. It should be emphasized, however, that the problems are local in nature. . . . The source of the selenium and fluoride appears to be a result of the host rock properties and the ground water characteristics.
>
> Low concentrations of radionuclides have been found in nearly all ground waters throughout the state. . . . Very high levels of radionuclear species have been found associated with these [commercial uranium] deposits.

Throughout the state's aquifers, sulfate and chloride levels often exceed the secondary drinking water standards and standards for livestock use. Mostof the high levels detected are correlated with levels of total dissolved solids (TDS) of more than 500 mg/l for domestic uses and 5,000 mg/l for livestock use. Many of Wyoming's residents drink poor quality water because no other is available.

Causes of Pollution

The energy industry is creating potential sources of aquifer contamination at a very rapid pace. Petroleum-related injection wells, in situ uranium injection wells, and coal gasification injection wells are major potential sources of groundwater pollution. Coal mine, uranium mine, oil refineries, and increasing numbers of septic tank leach fields are other potential sources. Map 40 depicts sources of potential groundwater pollution.

Locally, groundwater has been polluted by leachates from mine spoils and oil field holding ponds.

Groundwater pollution is discussed in the following excerpts from *Wyoming 1986 Water Quality Assessment* (Wyo. DEQ 1986).

> Much groundwater sampling has been done in areas of commercial coal deposits. Trace element concentrations exceeding primary drinking water standards are often reported. Groundwater of this nature is rarely used for drinking water and is confined to local areas around the deposits.
>
> Injection wells . . . provide a potentially grave threat to the deeper aquifers. Local deterioration of nearby drinking water aquifers is always a possibility when underground injection is being considered. Improper well completion is a common cause of drinking water aquifer contamination near injection operations.

Air Resources

Climate

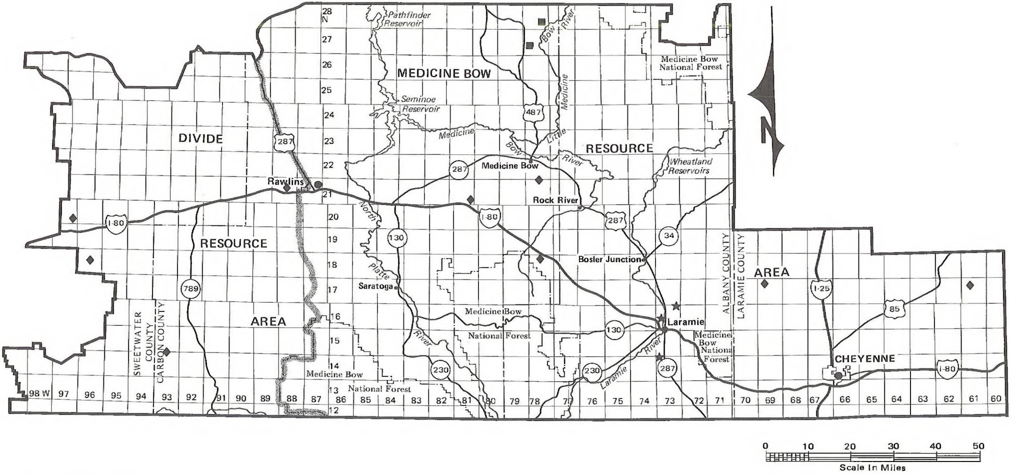
Temperature

The annual mean temperature in the planning area is in the low to mid 40s (degrees Fahrenheit). A January high temperature of 30 degrees F and a low near 10 degrees F is typical. July temperatures typically range from 49 degrees to 83 degrees F. The average is 8 degrees F lower during the winter and 4 degrees F lower during the summer at higher elevations and in valleys adjacent to the mountains. The highest temperature recorded was 109 degrees F in the eastern part of the planning area; the lowest was minus 55 degrees F in the central part of the planning area.

The number of frost-free days ranges from a low of 9 days in Foxpark to a high of 134 at Cheyenne. The average number of frost-free days in the planning area is 96.

Precipitation

The mean annual precipitation in the planning area is approximately 13 inches. The range is a low of 5.85 inches at Wamsutter and a high of 18 inches at Albin. At higher elevations in and adjacent to the Medicine Bow National Forest, precipitation is more than 20 inches. Precipitation tends to increase during the spring, reaches a maximum during the summer, decreases during the fall, and reaches a minimum during the winter. Table 10 shows mean monthly and annual precipitation measured in the planning area.



■ Uranium Mill

● Petroleum Refinery

★ Other Hazardous Waste Facility

◆ Areas of Underground Injection

Map 40

POTENTIAL SOURCES OF GROUNDWATER POLLUTION

Medicine Bow-Divide Resource Management Plan

TABLE 10

MEAN PRECIPITATION IN THE PLANNING AREA
(inches)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Dixon	0.91	0.67	0.92	1.18	1.25	1.09	0.99	1.07	0.96	1.25	0.78	0.98	12.05
Rawlins	0.47	0.55	0.67	1.06	1.18	0.90	0.71	0.66	0.78	0.82	0.50	0.54	8.84
Seminoe Dam	0.63	0.75	1.08	1.81	1.99	1.48	0.84	0.69	0.87	1.08	0.78	0.68	12.72
Wamsutter	0.15	0.21	0.26	0.54	0.80	0.81	0.61	0.78	0.60	0.52	0.27	0.30	5.85
Albin	0.65	0.59	1.43	2.02	3.21	2.82	2.07	1.43	1.22	1.02	0.78	0.71	18.00
Archer	0.42	0.33	0.90	1.56	2.60	2.79	2.00	1.50	1.21	1.00	0.54	0.33	15.24
Carpenter	0.25	0.22	0.78	1.25	2.52	2.54	2.06	1.55	1.30	0.70	0.37	0.32	13.86
Centennial 1N	1.14	0.89	1.13	1.42	1.64	1.54	1.46	1.32	1.13	0.83	0.94	1.14	13.62
Cheyenne	0.44	0.42	1.06	1.54	2.43	2.26	1.94	1.38	1.09	0.86	0.57	0.35	14.40
Double 4 Ranch	0.47	0.41	0.94	1.88	2.67	2.56	1.71	1.16	1.16	0.80	0.67	0.51	15.00
Elk Mountain	0.78	0.80	1.22	1.62	1.52	1.46	0.93	0.91	1.08	1.05	0.82	0.64	12.84
Encampment	0.83	0.77	1.35	1.83	1.71	2.24	1.29	1.58	1.25	1.30	0.98	0.93	16.08
Foxpark	1.40	1.27	1.54	1.63	1.57	2.02	1.60	1.50	1.19	1.02	1.13	1.15	17.04
Hecla	0.49	0.49	1.18	2.01	2.59	2.18	2.12	1.34	0.95	1.05	0.68	0.47	15.60
Laramie	0.46	0.40	0.63	0.98	1.31	1.36	1.45	1.09	0.89	0.78	0.51	0.36	10.20
Leo 6SW	0.59	0.65	0.92	1.49	1.64	1.27	0.79	0.68	0.80	1.01	0.68	0.58	11.16
Medicine Bow	0.50	0.47	0.74	1.15	1.38	1.24	1.26	0.71	0.94	0.77	0.56	0.52	10.21
Pine Bluffs	0.36	0.28	0.90	1.40	2.81	3.05	1.98	1.74	1.12	0.81	0.48	0.34	15.24
Saratoga	0.45	0.39	0.70	1.06	1.18	1.15	0.88	0.90	0.88	0.96	0.51	0.48	9.60
Tennyson	0.53	0.48	1.10	1.89	2.65	2.66	2.15	1.37	1.18	1.01	0.63	0.48	16.08

Other climatic conditions will be discussed in the "Air Quality" section.

Air Quality

Standards

Air quality is based on pollutants emitted into the atmosphere and the dispersion potential of an area to dilute pollutant. Table 11 lists Wyoming and national ambient air quality standards (NAAQS) and the incremental increases allowed above the baseline in Class I, II, or III air quality areas. The air quality classes are defined as follows:

> Class I areas are areas in which only a minimal amount of air quality deterioration would be considered acceptable.
>
> Class II areas are areas in which deterioration normally would accompany planned growth. The acceptable limit of deterioration is somewhat greater than in a Class I area.
>
> Class III areas are areas in which deterioration would be acceptable provided that NAAQS were maintained.

The planning area is in a Class II air quality area. There are no Class I air quality areas in the planning area.

Primary air quality standards are based on safety and health hazards. Secondary standards are based on adverse effects on soil, water, plants, visibility, and personal comfort and well-being.

Visibility provides an indication of atmospheric clarity. Visibility measurements or estimates generally are expressed in miles or kilometers denoting the maximum distance at which one can distinguish objects such as buildings, mountains, and other large landmarks.

Visibility can be reduced by numerous physical factors, including general air quality as well as thermodynamic and optical properties. Some common factors that can reduce visibility and contrast are air moisture content; relative humidity; falling rain, snow, or hail; blowing dust; and high concentrations of suspended particulate matter, sulfates, oxides of nitrogen, and smoke.

TABLE 11

WYOMING AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Contaminants	Wyoming Standards (mcg/m^3)	National Standards (mcg/m^3)		Maximum Allowable Increments for Prevention of Significant Deterioration[8] (mcg/m^3)		
		Primary	Secondary	Class I	Class II	Class III
Total Suspended Particulates						
24-Hour[1]	150.0	260.0	150.0	10	37	75
Annual[2]	60.0	75.0	60.0	5	19	37
Sulfur Dioxide						
3-Hour[1]	1,300.0	N/A	1,300.0	25	512	700
24-Hour[1]	260.0	65.0	N/A	5	91	182
Annual[3]	60.0	80.0	N/A	2	20	40
Nitrogen Dioxide						
Annual[3]	100.0	100.0	100.0	—	—	—
Carbon Monoxide						
1-Hour[1]	40,000.0	40,000.0	40,000.0	—	—	—
8-Hour[1]	10,000.0	10,000.0	10,000.0	—	—	—
Hydrogen Sulfide[4]						
0.5-Hour[5]	70.0	N/A	N/A	—	—	—
0.5-Hour[6]	40.0	N/A	N/A	—	—	—
Hydrogen Fluoride[4]						
24-Hour	0.8	N/A	N/A	—	—	—
Photochemical Oxidants (O_3)						
1-Hour	160.0	235.0	235.0	—	—	—

TABLE 11 (Continued)

WYOMING AND NATIONAL AMBIENT AIR QUALITY STANDARDS

Contaminants	Wyoming Standards (mcg/m^3)	National Standards (mcg/m^3)		Maximum Allowable Increments for Prevention of Significant Deterioration[8] (mcg/m^3)		
		Primary	Secondary	Class I	Class II	Class III
Volatile Organic Compounds (nonmethane)[7]						
3-Hour[1]	160.0	N/A	N/A	—	—	—
Lead						
3-Month	1.5	1.5	1.5	—	—	—

SOURCE: U.S., Department of the Interior, Bureau of Land Management, and Department of Agriculture, Forest Service, *Draft Environmental Impact Statement on the Riley Ridge Natural Gas Project* (Denver, 1983), p. 4-40.

NOTE: Temporary construction-related emissions as well as the more permanent operations-related impacts are subject to national ambient air quality standards (NAAQS) and Wyoming ambient air quality standards (WAAQS). However, emissions resulting from emergency upsets and start-up and shut-down activities are exempted from NAAQS and WAAQS compliance.

[1] Not to be exceeded more than once per year.

[2] Annual geometric mean, never to be exceeded.

[3] Annual arithmetic mean, never to be exceeded.

[4] Wyoming ambient standard only.

[5] Not to be exceeded more than twice per year.

[6] Not to be exceeded more than twice in any five consecutive days.

[7] Wyoming ambient standard. Federal hydrocarbon standard was repealed by EPA.

[8] Incremental prevention of significant deterioration (PSD) standards are the maximum incremental amounts of pollutants allowed above the baseline in regions of clean air.

Visibility information is available at Cheyenne and at Rawlins. These stations report visibility of more than 25 miles at least 75% of the time during the day and visibility of more than 10 miles more than 80% of the time.

The main air quality pollutant in Wyoming is total suspended particulates (TSP). Levels are highest near population centers. Table 12 gives seasonal and annual means of TSP in the planning area. Two other pollutants that Wyoming measures are sulfur dioxide and nitrogen dioxide. Measurements indicate levels of these pollutants are extremely low in Wyoming. There have been no violations in the planning area for exceeding TSP.

TABLE 12

SEASONAL AND ANNUAL MEANS OF TOTAL SUSPENDED PARTICULATES

Site		Winter	Spring	Summer	Fall	Annual
RAWLINS DISTRICT						
Divide Resource Area						
Baggs	Mean	NA	NA	103	24	46
	Maximum	NA	NA	136	42	136
Sinclair	Mean	9	20	25	NA	18
	Maximum	14	67	42	NA	67
Medicine Bow Resource Area						
Cheyenne	Mean	32	49	50	48	45
	Maximum	58	134	80	72	134
Laramie	Mean	31	41	39	50	41
	Maximum	69	119	62	77	119

Table 13 gives the long-term trend of TSP in the Rawlins District. Map 41 locates point sources of pollution in Wyoming that emit 100 or more tons per year of pollutants. Tables 14 and 15 list the sources, amounts, and kinds of pollutants emitted.

Dispersion Potential

Air quality is determined not only by the pollutants emitted into the atmosphere, but also by the ability of an area to disperse or dilute pollutants. This ability is determined by climatic factors: prevailing winds, atmospheric stability, and mixing heights.

Prevailing Winds. The concentration of air pollutants is inversely proportional to wind speed. The higher the wind speed, the lower the air pollution concentration.Figures 8 and 9 depict wind speed frequencies for Cheyenne and Rawlins. Wind speeds in Rawlins tend to indicate adequate dispersion potential in the resource area.

TABLE 13

LONG-TERM TRENDS OF TOTAL SUSPENDED PARTICULATES IN THE RAWLINS DISTRICT

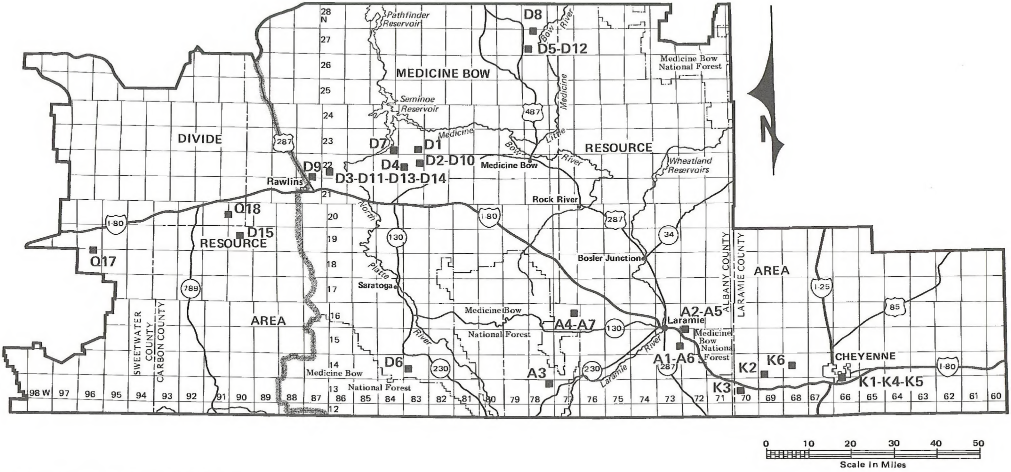
Site	Long-Term Mean (in micrograms per cubic meter)	Period of Record	1978 Mean (in micrograms per cubic meter)
Rawlins	18	1975-1977	NA
Baggs	NA	NA	31
Sinclair	NA	NA	16
Cheyenne	39	1972-1977	40
Laramie	50	1972-1977	37

Atmospheric Stability. Atmospheric stability is determined by the difference between adiabatic lapse rate and environmental lapse rate. Adiabatic lapse rate is the constant change in temperature when a given parcel of air cools with lifting or heats with descent. The constant change in temperature of a parcel of vertically displaced dry air occurs at a fixed rate of 1 degree Celsius per 100 meters. The environmental lapse rate is the rate at which the atmospheric temperature decreases (measured vertically from the ground upward).

When the environmental lapse rate is less than the adiabatic lapse rate, no vertical movement will occur, and stable conditions will exist. This commonly occurs at night when the earth's surface cools through radiation of heat from the ground. When the environmental lapse rate is greater than the adiabatic lapse rate, vertical movement occurs, creating unstable conditions. This occurs mainly during the day or in periods of high net positive radiation toward the earth's surface. Neutral conditions occur when the environmental lapse rate equals the adiabatic lapse rate. This usually occurs when skies are cloudy and wind speeds are high.

Figures 10 and 11 illustrate seasonal/annual distribution of atmospheric stability at Cheyenne and Rawlins.

Conditions in the planning area are good for dispersion of pollutants because unstable conditions and neutral conditions with associated high wind speeds predominate. Conditions are stable less than 30% of the time throughout the year.



■ Location of Point Source Air Pollution

Map 41

LOCATIONS OF POINT SOURCE AIR POLLUTION EMITTING 100 OR MORE TONS/YEAR ANNUALLY

Medicine Bow-Divide Resource Management Plan

TABLE 14

WYOMING-BASED COMPANIES EMITTING 100 OR MORE TONS OF POLLUTANTS PER YEAR

County/Site	Company
Albany County	
A1	J.H. Baxter Wood Preserving
A2	Big Horn Lumber
A3	Brandt & Wicklund
A4	Colorado Interstate Gas
A5	Monolith Portland Cement
A6	Resources Refining
A7	Colorado Interstate Gas, Laramie Station
Carbon County	
D1	Arch Minerals, Seminoe I Mine
D2	Arch Minerals, Seminoe II Mine
D3	Colorado Interstate Gas
D4	Energy Development
D5	Getty - Petrotonics
D6	Hammer Lumber
D7	Medicine Bow Coal Company
D8	Pathfinder (Luck Mc.)
D9	Rawlins Sand and Gravel
D10	Rosebud Coal Company
D11	Sinclair Oil Corporation
D12	Uranium Supply Services
D13	Colorado Interstate Gas
D14	Colorado Interstate Gas, Rawlins Station
D15	Diglygolcol Amine Plant, Cordillera Corporation
Laramie County	
K1	Husky Oil Refinery
K2	Morrison-Knudsen
K3	Peter Kiewit Sons
K4	Teton Construction
K5	Union Pacific Railroad
K6	Wycon Chemical
Sweetwater County	
Q17	PEPL Company
Q18	Cities Service Gas Company, Riner Station

TABLE 15

POINT SOURCE EMISSIONS IN WYOMING

Source	Emission Point[1]	Stack Height (feet)	Inside Stack Diameter (feet)	Exit Temperature (degrees F)	Exit Velocity (feet per second)	Volume Flow (acre-feet per minute)	Annual Tonnage Emissions				
							Total Suspended Particulates	Sulfur Oxides	Nitrogen Oxides	Hydro-carbons	Carbon Monoxide
Albany County											
Brandt & Wickland	01	58	24.0	700	0.00	0	44	1	6	69.000	813
Monolith Portland Cement	01	150	8.0	380	33.20	100,000	179	2,354	559	0.000	0
	02	130	12.0	383	30.80	0	619	2,725	—	—	—
Craig Lumber	01	60	20.0	400	0.00	0	130	1	7	72.000	845
Big Horn Lumber	01	35	12.0	700	0.00	0	45	1	6	70.000	832
Colorado Interstate Gas Company	01	35	2.5	700	36.50	4,664	—	—	357	14.000	47
	02	35	2.5	700	36.50	4,664	—	—	357	14.000	47
	03	35	2.5	700	36.50	4,664	—	—	357	—	—
	04	21	1.3	820	14.90	4,761	—	—	0	—	—
	05	21	1.5	350	16.00	1,000	—	—	1	—	—
	06	200	4.0	600	98.00	—	—	905	357	14.000	47
Carbon County											
Pasco Inc.	01	100	6.5	650	36.20	72,000	11	108	40	3.000	0
	02	100	6.5	650	36.20	72,000	11	108	40	3.000	0
	03	100	6.5	650	36.20	72,000	11	108	40	3.000	0
	04	100	6.5	650	36.20	72,000	11	108	40	3.000	0
	05	0	0.0	0	0.00	0	37	333	176	15.000	0
	06	0	0.0	0	0.00	0	37	333	176	15.000	0
	07	0	0.0	0	0.00	0	37	333	176	15.000	0
	08	0	0.0	0	0.00	0	37	333	176	15.000	0
	09	128	4.5	950	183.40	175,000	253	0	168	0.000	32,326
	10	0	0.0	0	0.00	0	0	0	0	182.000	0
	11	0	0.0	0	0.00	0	0	0	0	111.000	0
Rosebud Coal	01	4	2.0	70	26.50	5,000	100	0	0	0.000	0
Edward Hines Lumber	01	61	25.0	700	0.00	0	11	1	11	124.000	1,463
	02	0	0.0	0	0.00	0	40	0	42	8.000	8

TABLE 15 (Continued)

POINT SOURCE EMISSIONS IN WYOMING

Source	Emission Point[1]	Stack Height (feet)	Inside Stack Diameter (feet)	Exit Temperature (degrees F)	Exit Velocity (feet per second)	Volume Flow (acre-feet per minute)	Annual Tonnage Emissions				
							Total Suspended Particulates	Sulfur Oxides	Nitrogen Oxides	Hydro-carbons	Carbon Monoxide
Getty-Petrotomics	01	41	1.0	0	0.00	0	0	0	0	0.000	0
	02	0	0.0	0	0.00	0	2	6	12	0.000	0
	03	35	26.6	—	—	—	—	—	—	26.000	—
	04	35	26.6	—	—	—	—	—	—	25.000	—
City Service Gas	01	37	2.0	600	56.70	21,793	0	0	202	69.000	17
Cordillera Corp.	01	50	1.0	1125	26.20	3,453	—	239	—	—	—
	02	50	1.0	1125	26.05	3,453	—	215	—	—	—
Colorado Interstate Gas Company	01	26	1.8	700	42.40	6,120	—	—	140	6.000	18
	02	26	1.8	700	42.40	6,120	—	—	140	6.000	18
	03	26	1.8	700	42.40	6,120	—	—	140	6.000	18
	04	26	2.0	700	43.20	8,150	—	—	187	8.000	24
	05	26	2.0	700	43.20	8,150	—	—	187	8.000	24
	06	18	1.0	700	58.50	2,870	—	—	71	3.000	9
	07	18	1.0	700	58.50	2,870	—	—	71	3.000	9
	08	18	1.0	700	58.50	2,870	—	—	71	3.000	9
	09	18	1.0	700	58.50	2,870	—	—	71	3.000	9
	10	10	0.3	800	25.60	755	—	—	—	—	—
	11	10	0.3	800	28.90	850	—	—	—	—	—
	12	19	1.3	350	8.10	644	—	—	—	—	—
	13	19	1.3	350	8.10	644	—	—	—	—	—
	14	25	6.5	350	13.30	13,253	1	—	23	.050	—
	15	18	1.0	350	10.40	492	—	—	—	—	—
	16	15	0.9	350	2.80	95	—	—	—	—	—
	17	26	1.3	350	13.60	1,136	—	—	1	.002	—
Laramie County											
Husky Oil	01	55	5.0	400	46.70	55,000	107	829	128	1.000	7
	02	55	5.0	400	46.70	55,000	107	829	128	1.000	7
	03	55	5.0	450	19.10	22,500	2	272	27	1.000	3
	04	55	4.0	400	28.30	21,300	206	1,108	112	1.000	4
	05	55	4.0	400	28.30	21,300	206	1,108	112	1.000	4
	06	150	3.0	450	8.00	3,400	40	1,658	100	1.000	7

TABLE 15 (Continued)

POINT SOURCE EMISSIONS IN WYOMING

Source	Emission Point[1]	Stack Height (feet)	Inside Stack Diameter (feet)	Exit Temperature (degrees F)	Exit Velocity (feet per second)	Volume Flow (acre-feet per minute)	Annual Tonnage Emissions				
							Total Suspended Particulates	Sulfur Oxides	Nitrogen Oxides	Hydro-carbons	Carbon Monoxide
	07	136	3.0	450	125.00	53,000	125	1,200	89	3.000	13
	08	46	3.0	500	15.30	6,500	70	800	139	2.000	12
	09	46	3.0	500	15.30	6,500	70	800	139	2.000	12
	10	0	0.0	0	0.00	0	0	0	0	1,398.000	0
	11	0	0.0	0	0.00	0	0	0	0	1,398.000	0
	12	0	0.0	0	0.00	0	0	0	0	1,398.000	0
	13	0	0.0	0	0.00	0	0	0	0	1,398.000	0
	14	—	—	—	—	—	364	1,000	—	—	—
Wycon Chem	01	130	5.0	0	61.10	71,980	148	0	0	0.000	0
Morrison Knudsen	01	0	0.0	77	0.00	0	602	0	0	0.000	0
F.E. Warren AFB	01	123	5.0	440	65.0	—	64	604	450	—	—
Union Pacific Railroad	01	—	—	—	—	—	20	619	60	—	—
Sweetwater County											
City Services Gas Company	01	—	—	—	—	—	—	—	225	9.000	28
Panhandle Eastern Pipe Line Company Tipton Fac.	01	17	.8	750	120.0	3,900	—	—	72	6.000	35
	02	17	.8	750	120.0	3,900	—	—	72	6.000	35
Colorado Interstate Gas Company Wamsutter Compressor Station	01	26	3.3	820	36.0	17,998	—	0	30	—	11
	02	26	3.3	820	36.0	17,998	—	0	30	—	11
	03	26	3.3	820	36.0	17,998	—	0	30	—	11
	04	20	2.0	800	6.8	1,280	—	—	1	—	—

SOURCE: Rykaczewski, D.; Ryne, M.; Ewing, C.; and Ogliaro, F., "Final Report: Baseline Climate and Air Quality for BLM Lands in Wyoming," (LaJolla, CA: Science Applications, 1980). Prepared under contract for the Bureau of Land Management.

[1] Refers to an individual stack or fugitive dust source.

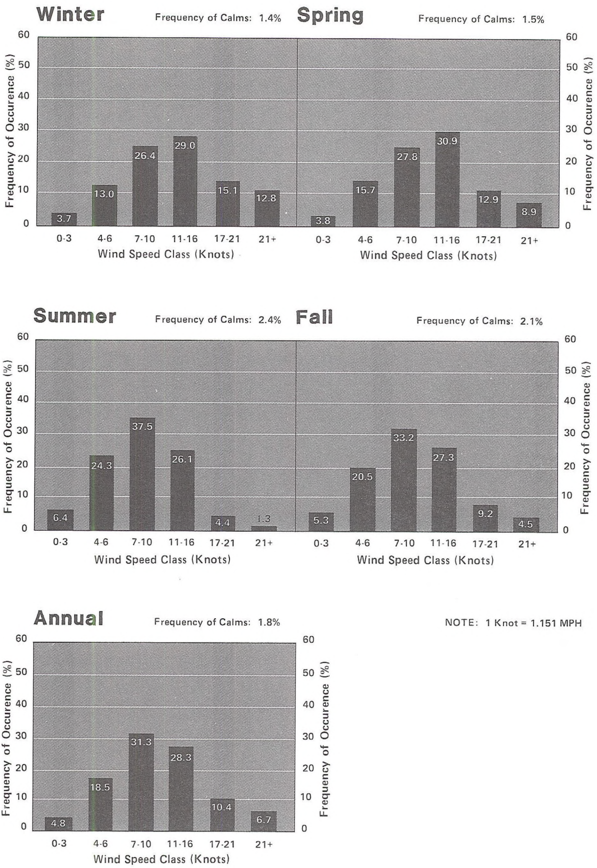
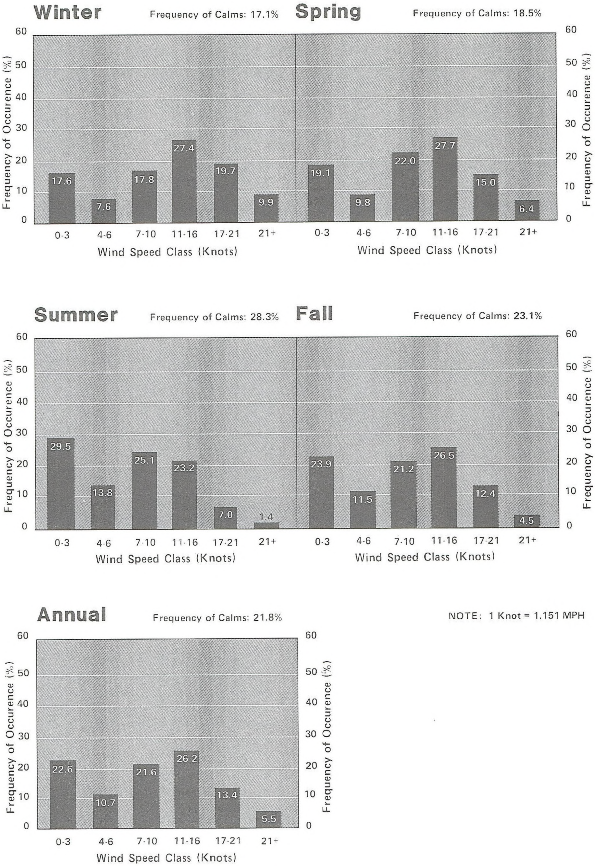


Figure 8
FREQUENCY OF OCCURRENCE OF
KEY WIND SPEED CLASSES AT CHEYENNE



NOTE: 1 Knot = 1.151 MPH

Figure 9
FREQUENCY OF OCCURRENCE OF
KEY WIND SPEED CLASSES AT RAWLINS

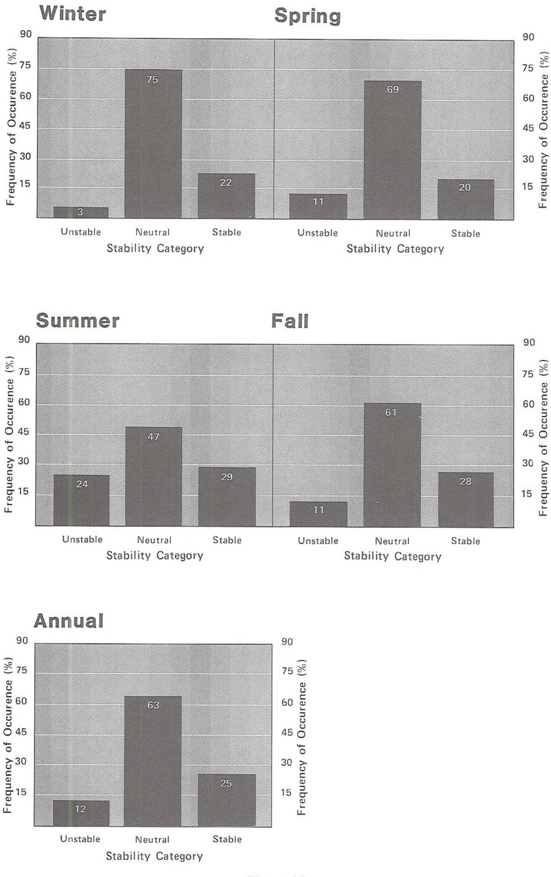


Figure 10
SEASONAL/ANNUAL DISTRIBUTION OF
ATMOSPHERIC STABILITY AT CHEYENNE

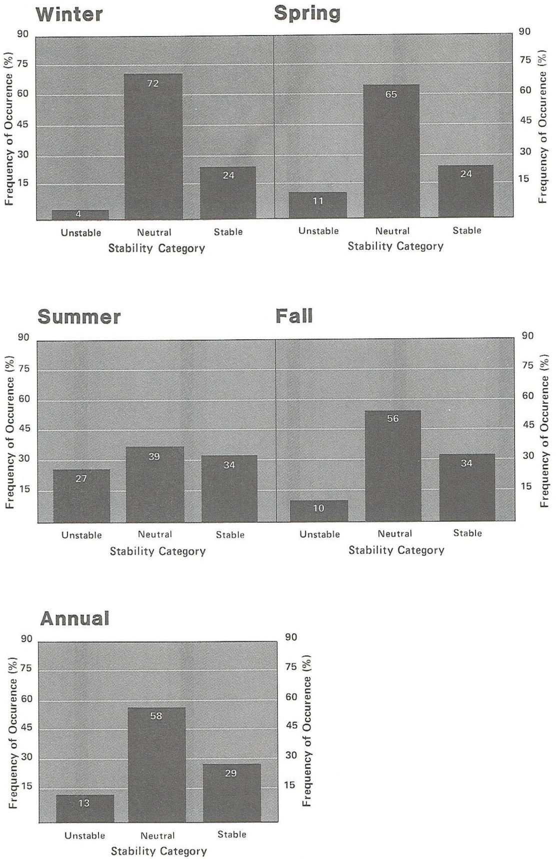


Figure 11
SEASONAL/ANNUAL DISTRIBUTION OF
ATMOSPHERIC STABILITY AT RAWLINS

Mixing Heights and Inversions. Mean annual mixing heights in Wyoming range from several hundred feet to about 12,000 feet. Table 16 shows seasonal and annual mixing heights for Wyoming.

Inversions tend to reduce mixing heights. Surface-based inversions result in a layer of stable air close to the ground with very light wind speeds. Elevated inversions trap pollutants beneath a stable air mass that is some height above the surface. Little information is available on inversions in the planning area.

TABLE 16

MEAN SEASONAL AND ANNUAL MIXING LAYER HEIGHTS IN WYOMING 1960-1964

	Mixing Height			
	Morning		Afternoon	
Period	Meters	Feet	Meters	Feet
Winter	300-400	980-1,300	800-1,400	2,600-4,600
Spring	400-600	1,300-2,000	2,400-3,000	7,900-9,800
Summer	approx. 300	approx. 980	2,600-3,800	8,500-12,000
Fall	200-400	700-1,300	1,600-2,100	5,000-6,900
Annual	300-400	980-1,300	1,800-2,500	5,900-8,200

SOURCE: Holzworth, G.C., *Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution throughout the Contiguous United States* (N.p., 1972).

Air Basins in the Planning Area

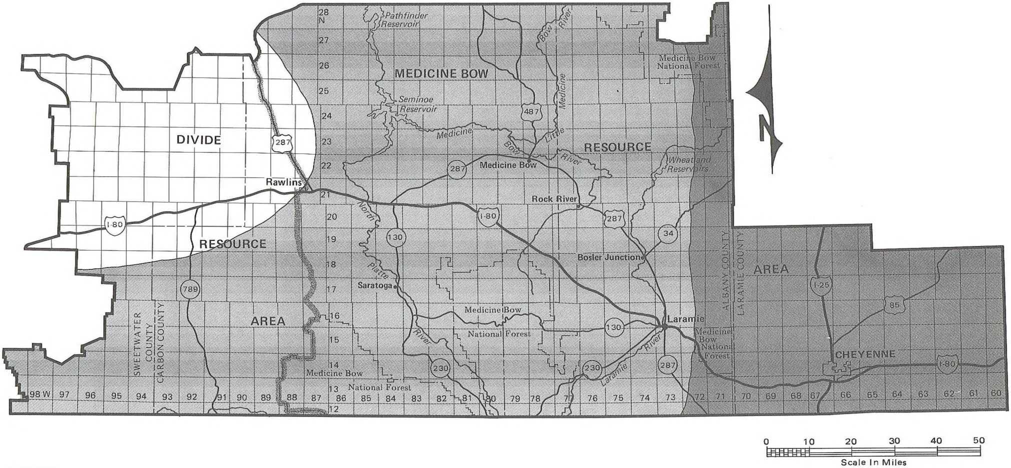
Map 42 shows air basins in Wyoming that exhibit different atmospheric flow, ventilation mechanism, and dispersion potential. The planning area lies within the Great Divide, Laramie, and Plains air basins. Their characteristics are summarized in the following sections.

Laramie Air Basin. The Laramie Air Basin comprises a fair portion of south central Wyoming. The basin is bordered by the Wyoming-Colorado state line to the south, the Laramie Mountains to the east, the Granite Mountains to the north, and the Great Divide Basin to the west. Terrain in the Laramie air basin is complex. Transport from the west and southwest dominates in level terrain areas, and dispersion results from unstable conditions induced by surface heating during the day. Likewise, stable conditions can be expected at night as the earth cools. In areas with significant terrain features such as the Medicine Bow, Shirley, and Green Mountains, transport is more complex. Typical mountain-valley coupling effects are evident in those areas, along with significant diurnal variations in the local wind field.

Plains Air Basin. The Plains Air Basin is composed of approximately one-third of eastern Wyoming. The air basin is bordered by the Big Horn Mountains in the northwest and the Laramie Mountains in the southwest. The Nebraska-Wyoming state line and the South Dakota-Wyoming state line constitute the eastern perimeter of this air basin.

Except for the area in the vicinity of the mountains, which form the western boundary, virtually the entire air basin is made up of reasonably homogeneous terrain. However, as mentioned previously, in the vicinity of the mountain ranges, dispersion conditions are difficult to determine. Complex upslope and downslope flows are likely to occur in response to surface heating, nighttime cooling, and the channeling effects in local valleys and river basins. Throughout the great extent of the Plains Air Basin, however, westerly winds prevail throughout the year. In the absence of significant terrain effects, strong solar heating during the day would promote unstable conditions, while stable conditions are likely to occur at night.

Cheyenne and Casper provide significant data on winds and stability for their regions. Unfortunately, those stations are in the immediate vicinities of mountainous terrain and therefore do not present representative dispersion conditions for the entire air basin.



□ Great Divide Basin

░ Laramie Basin

▓ Plains Basin

Map 42

AIR BASINS

Medicine Bow-Divide Resource Management Plan

Great Divide Air Basin. The Great Divide Air Basin comprises a relatively small portion of south central Wyoming, yet it includes most of the Great Divide Basin and most of the Red Desert. The terrain in the Great Divide Air Basin is essentially homogeneous, and regional transport is from the west throughout the year. On a daily basis, in the absence of significant terrain, unstable conditions can be expected during the daylight hours in response to strong surface heating, while extremely stable conditions can be expected at night as the earth cools. Rawlins, on the eastern periphery of this basin, provides significant wind and stability data applicable to the Great Divide Basin.

VEGETATION

Introduction

The annual precipitation in the planning area ranges from 7 to 19 inches (see map 31). Along with other environmental factors, precipitation produces distinct ecological sites commonly called range sites. The range sites in the planning area can be grouped into 11 major vegetative types: grass, meadow/riparian, sagebrush, greasewood, saltbush, mountain shrub, broadleaf trees, conifer, juniper, rockland, and barren. Table 17 depicts the precipitation zones, the major range sites, and the common plant species within each vegetative type.

On table 17, vegetation has been correlated with standard habitat sites for wildlife. Within each vegetative type, the associated habitat types are mentioned.

Vegetative Types

Grass

The average composition, by weight, of the grass vegetation type is 65% to 80% grass species, 10% to 15% forbs, and 10% to 20% shrubs. This type is important for livestock. Wildlife also use the grass during the spring season.

The standard habitat types included within this vegetative type are short grass, sagebrush-mixed grass, and sagebrush-mixed shrub.

Meadow/Riparian

The meadow/riparian vegetative type can be divided into two basic subtypes: woody riparian areas (where the vegetative community consists of willows, narrowleaf cottonwoods, waterbirch, chokecherry, aspen, bluegrasses, sedges, and rushes) and meadow areas (which contain mostly grasses, rushes, and sedges).

The standard habitat types in the woody riparian areas are cottonwood floodplain, willow/waterbirch floodplain, and aspen riparian woodland. The meadow subtype includes areas where the vegetative species are directly influenced by water. The standard habitat types that are associated with the meadow areas are wetland, riparian grassland, subirrigated meadow, and saline subirrigated meadow.

Woody riparian areas occupy less than 1% of the total planning area; however, this type has the greatest production per acre. It also contributes a large portion of the forage for livestock grazing. Meadow/riparian areas are generally the areas of heaviest use because of their high-quality forage and their proximity to water.

Sagebrush

The planning area is dominated by the sagebrush vegetative type. The average species composition for this type is 30% to 40% grasses, 5% to 10% forbs, and 50% to 65% shrubs. Big sagebrush is the most common subtype of the sagebrush vegetative type. The predominant plant species are Wyoming big sagebrush, basin big sagebrush, birdfoot sagebrush, and black sagebrush. Also included is the rabbitbrush subtype, which consists mainly of Douglas rabbitbrush and rubber rabbitbrush. Major grass species in the understory include Indian ricegrass, Sandberg bluegrass, needle-and-thread, western wheatgrass, bluebunch wheatgrass, and thickspike wheatgrass.

Standard habitat types within this vegetative type are big sagebrush-rabbitbrush, greasewood-sagebrush, black sagebrush, silver sagebrush, tall sagebrush, and yucca-mixed grass.

On summer ranges, or when there is an abundance of other forage plants, sagebrush is considered an undesirable plant for livestock grazing. The herbaceous understory vegetation is preferred when accessible; it provides the majority of the forage for livestock. Sagebrush

TABLE 17

MAJOR PLANT SPECIES

Vegetative Type	Precipitation Zone (inches)	Major Range Sites[1]	Grasses/Grasslikes	Forbs	Shrubs/Trees	Associated Wildlife Habitat Type
Grass	7-9 10-14	Shallow Clayey Impervious Clay	Western wheatgrass Thickspike wheatgrass Bluebunch wheatgrass Streambank wheatgrass Needle-and-thread Sandberg's bluegrass Indian ricegrass Blue grama Threeawn Prairie junegrass Threadleaf sedge Bottlebrush squirreltail	Biscuitroot Phlox Buckwheat Pussytoes Aster Woody aster	Big sagebrush Douglas rabbitbrush Birdsfoot sagebrush Black sagebrush Threetip sagebrush Gardner's saltbush Winterfat Bud sagebrush	Shortgrass Sagebrush-mixed shrub Sagebrush-mixed grass
Meadow/Riparian	All	Subirrigated Saline Subirrigated Wetland Lowland	Thickspike wheatgrass Kentucky bluegrass Tufted hairgrass Mat muhly Rushes Sedges Alkali sacaton Inland saltgrass Cattail Bulrushes Spikesedge Basin wildrye Redtop Mannagrasses Brookgrass	Thistle Iris Lupine Mints Horsetail Aster Violets Buttercup Sea milkwort Arrowgrass Plantain Goldenrod Cinquefoil	Rubber rabbitbrush Narrowleaf cottonwood Waterbirch Dogwood Common chokecherry Currant Shrubby cinquefoil Willow Silverberry Wild rose Aspen Buffaloberry Hawthorn	Riparian grassland Aspen riparian woodland Cottonwood floodplain Willow/waterbirch floodplain Wetland Subirrigated meadow Saline subirrigated meadow

Vegetative Type	Precipitation Zone (inches)	Major Range Sites[1]	Grasses/Grasslikes	Forbs	Shrubs/Trees	Associated Wildlife Habitat Type
Sagebrush	All	Sandy Loamy Clayey Shallow Sandy Shallow Loamy Sands	Western wheatgrass Thickspike wheatgrass Bluebunch wheatgrass Sandberg's bluegrass Indian ricegrass Threadleaf sedge Needle-and-thread Prairie junegrass Sand dropseed Prairie sandreed Plains reedgrass King-spike fescue Oniongrass Columbia needlegrass Basin wildrye Mountain brome Bottlebrush squirreltail Idaho fescue	Phlox Buckwheat Lupine Pussytoes Aster Milkvetch Indian paintbrush Plains prickly pear Penstemon Vetch	Black sagebrush Big sagebrush Douglas rabbitbrush Rubber rabbitbrush Broom snakeweed Silver sagebrush Shadscale Spiny hopsage Winterfat Birdsfoot sagebrush Horsebrush Skunkbush sumac Yucca Snowberry Bitterbrush	Greasewood-sagebrush Big sagebrush-rabbitbrush Yucca-mixed grass Black sagebrush Silver sagebrush Tall sagebrush Sagebrush-mixed grass
Greasewood	7-9	Saline Lowland	Sandberg's bluegrass Indian ricegrass Inland saltgrass Alkali sacaton Thickspike wheatgrass Bottlebrush squirreltail Basin wildrye Nuttall's alkaligrass	Pursh seepweed Dock Phlox Biscuitroot Plains prickly pear Pepperweed Globemallow Milkvetch Alyssum Onion	Black greasewood Big sagebrush Gardner's saltbush Winterfat Bud sagebrush Douglas rabbitbrush Birdsfoot sagebrush Rubber rabbitbrush	Greasewood-sagebrush Saltbush steppe Greasewood Mixed shrub
Saltbush	7-9	Saline Upland	Indian ricegrass Bottlebrush squirreltail Sandberg's bluegrass Western wheatgrass Bluebunch wheatgrass	Biscuitroot Onion Woody aster Phlox Penstemon Buckwheat	Gardner's saltbush Bud sagebrush Birdsfoot sagebrush Greasewood Shadscale Horsebrush Winterfat	Saltbush Steppe

TABLE 17 (Continued)

MAJOR PLANT SPECIES

Vegetative Type	Precipitation Zone (inches)	Major Range Sites[1]	Grasses/Grasslikes	Forbs	Shrubs/Trees	Associated Wildlife Habitat Type
Mountain shrub	10-14 15-19	Rocky Hills Loamy Shallow Loamy Very Shallow	Bluebunch wheatgrass Sandberg's bluegrass King-spike fescue Idaho fescue Mountain brome Threadleaf sedge Bottlebrush squirreltail Columbia needlegrass Indian ricegrass Western wheatgrass Ross' sedge	Penstemon Buckwheat Western yarrow Violet Lupine Cinquefoil Arnica Balsamroot	Antelope bitterbrush Snowberry Big sagebrush Skunkbush sumac Rubber rabbitbrush Silver sagebrush Common chokecherry Wild rose Ceanothus Serviceberry Western snowberry Currant Mountain mahogany	Mountain mahogany Bitterbrush-sagebrush Mountain shrubland
Broadleaf Trees	15-19	Aspen	Columbia needlegrass Elk sedge Bromegrasses Ryegrasses Sedges Kentucky bluegrass Big bluegrass Idaho fescue	Buckwheat Columbine Geranium Elkweed Licoriceroot Yarrow Arnica Cinquefoil Strawberry Lupine Waterleaf	Quaking aspen Snowberry Oregon grape Creeping juniper Buffaloberry Currant Douglas-fir Wild rose	Aspen woodland Aspen-conifer wood
Conifer	10-14 15-19	No major range site identified	Bluegrasses Sedges Mountain brome Idaho fescue Western wheatgrass Elk sedge Needlegrass Pinegrass	Arnica Balsamroot Penstemon Bedstraw Vetch Hawksbeard Western yarrow Aster Mountain pea Wintergreen	Big sagebrush Limber pine Lodgepole pine Ponderosa pine Snowberry Common chokecherry Quaking aspen Antelope bitterbrush Creeping juniper Grouse whortleberry Oregon grape Douglas-fir Englemann spruce	Limber pine woodland Limber pine/juniper woodland Aspen-conifer woodland Douglas-fir forest Lodgepole pine forest Laramie Peaks rockland

TABLE 17 (Continued)

MAJOR PLANT SPECIES

Vegetative Type	Precipitation Zone (inches)	Major Range Sites[1]	Grasses/Grasslikes	Forbs	Shrubs/Trees	Associated Wildlife Habitat Type
Juniper	10-14	Shallow Breaks	Mutton bluegrass Western wheatgrass Threadleaf sedge Bluebunch wheatgrass Idaho fescue Indian ricegrass Green needlegrass Needle-and-thread Thickspike wheatgrass Prairie junegrass	Indian paintbrush Larkspur Penstemon Goldenweed Aster Buckwheat Stonecrop	Utah juniper Rocky Mountain juniper Big sagebrush Winterfat Low rabbitbrush Antelope bitterbrush Mountain mahogany	Utah juniper woodland Mountain shrubland Utah juniper woodland-Limber pine woodland
Rockland	10-14 15-19	Igneous Shallow Igneous	Prairie junegrass Creeping wheatgrass Thickspike wheatgrass Griffith wheatgrass Bluebunch wheatgrass Idaho fescue Onespike danthonia Slimstem muhly Mountain muhly Columbia needlegrass	Penstemon Pussytoes Biscuitroot Phlox Cinquefoil Balsamroot Yarrow Aster Stonecrop	Rocky Mountain juniper Limber pine Big sagebrush Creeping juniper Antelope bitterbrush Snowberry Black sagebrush Currant Oceanspray	Laramie Peaks rockland
Barren	All	Badland Rock Outcrop Barren Steep Slope Shale	If vegetation is present at all, most of the plant species associated with the waste subtypes in the RMP area are those associated with the shortgrass, sagebrush, mountain shrubs, or juniper types. Laramie Peaks rockland			Limber pine woodland Mountain mahogany Badland

[1] SCS site identification

can be an important plant for some wildlife species such as mule deer, pronghorn antelope, and sage grouse.

Greasewood

The average composition of the greasewood vegetation is 20% grasses, 10% forbs, and 70% shrubs. The major plant species in this type are black greasewood, alkali sacaton, and western wheatgrass. This type occurs on lowland areas with deep, medium to heavy textured saline soils.

Standard habitat types in this vegetative type are greasewood-sagebrush, saltbush, mixed shrub, and greasewood.

Saltbush

Vegetation species composition within the saltbush vegetation type is similar to that of the greasewood vegetation type because the species are tolerant of a high salt concentration. However, greasewood is replaced by Nuttall's saltbush, and Indian ricegrass and bottlebrush squirreltail occur in addition to western wheatgrass. The sites on which the saltbush vegetation exist are normally in a more upland position than the greasewood type and do not endure long periods of time under water. One standard habitat type associated with the saltbush vegetation type is saltbush steppe. The saltbush vegetation type is an important source of forage for livestock and wildlife.

Mountain Shrub

The composition of the mountain shrub vegetative type averages 92% shrubs, 3% grasses, and 5% forbs. The major plant species in this type is mountain mahogany, with lesser amounts of bitterbrush, snowberry, big sagebrush, serviceberry, chokecherry, and currant. Mountain shrub occurs on foothills and mountain slopes. The principal use for this type is for wildlife forage.

The standard habitat types are mountain mahogany, bitterbrush-sagebrush, and mountain shrubland.

Broadleaf Trees

The broadleaf trees vegetative type is dominated by quaking aspen, with an understory consisting of snowberry, Oregon grape, creeping juniper, grasses, and sedges. The standard habitat type that falls into this vegetative type is quaking aspen woodland. This vegetation type is considered important habitat for livestock, mule deer, and elk, particularly in spring, summer, and fall.

Conifer

The conifer vegetative type comprises all rangeland in coniferous timber that supports grasses, forbs, or shrubs. It generally is found at higher elevations. The major overstory species in this type are lodgepole pine, limber pine, Rocky Mountain juniper, ponderosa pine, Douglas-fir, subalpine fir, and Engelmann spruce. Livestock and wildlife use conifer for cover, shade, and forage.

Six standard habitat types have been identified as part of the conifer vegetative type: limber pine woodland, aspen-conifer woodland, limber pine-juniper woodland, lodgepole pine forest, Douglas-fir forest, and Laramie Peaks rockland.

Juniper

The composition of the juniper vegetative type averages 20% to 25% trees and shrubs, 70% grasses, and 5% to 10% forbs. This vegetative type, which consists mainly of Utah juniper, sagebrush, and bluebunch wheatgrass, occurs on hills and low mountain slopes with shallow soils. In the planning area, the juniper vegetative type is found on Powder Rim, on the lower slopes of the Sierra Madre, and in scattered locations in the Ferris and Seminoe mountains. Livestock use of this type is sometimes limited because of the roughness of the terrain. Its primary use is as a cover for wildlife. It is often important mule deer habitat, particularly in winter.

Standard habitat types within this vegetative type are Utah juniper woodland, Utah juniper-limber pine woodland, and mountain shrubland.

Rockland

The average composition of the rockland vegetation type is 60% grass species, 10% forbs, and 30% shrubs and trees. The vegetative community consists of scattered limber pine, ponderosa pine, and Rocky Mountain juniper, along with big sagebrush, black sagebrush, creeping juniper, and snowberry. The shallow and more open areas are dominated by grass species such as wheatgrass species, Idaho fescue, onespike danthonia, and slimstem muhly. Aspen pockets and granite outcroppings are other features of the rockland type.

Livestock use of the rockland vegetation type is limited by the roughness of the terrain. The standard habitat type is Laramie Peaks rockland; it is of considerable importance for the forage and cover that it provides for wildlife.

Barren

Areas in the barren vegetative type contain minimal or no forage vegetation or are inaccessible. Examples are rock outcrops, active sand dunes, dry lake beds, or extremely steep or rocky badlands. Three standard wildlife habitat types have been identified for this vegetative type: badland/shale, Laramie Peaks rockland, and limber pine woodland.

Poisonous Plants

Poisonous plants are a normal component of the range ecosystem. Most poisonous plant species will kill animals only if they are eaten in large amounts–almost a straight diet of them (Stoddart, Smith, and Box 1975). Several factors play an important role in livestock poisoning: the animals' seasonal susceptibility to the poisonous plant, the formation of the poisonous portion of the plant, the susceptibility of certain kinds of animals to poisoning from a particular plant, or deficiency of minerals in the diet.

A shortage of salt in the diet may cause animals to eat plants they would not normally eat. Shortages of other minerals such as phosphorus induce abnormal appetites, causing the animal to consume low-value vegetation, including poisonous plants. Although poisonous plants can be found throughout the planning area, there are few large concentrations, and there is sufficient quality forage available for livestock. Poisonous plants could affect turn-out dates; some plants are not toxic after they have matured.

Some plants are toxic because of the high occurrence of the trace element selenium in soils of south central Wyoming. Specific plants (woody aster, for example) absorb selenium, and they can be very toxic when consumed by livestock. Selenium acts as a cumulative poison and can cause chronic poisoning effects over a long period or quick death if consumed in quantity. Local names for this poisoning effect include "alkali disease" and "blind staggers." Extremely large concentrations of woody aster and other selenium-accumulating plants occur in Poison Basin west of Baggs, Sage Creek Basin south of Rawlins, Alkali Basin north of Sinclair, and Hanna and Shirley basins.

Fourteen species of poisonous plants are known to exist in the planning area. Table 18 lists poisonous species, dangerous seasons, and grazing animals endangered.

TABLE 18

POISONOUS PLANTS IN THE PLANNING AREA

Species	Dangerous Season(s)	Kind of Livestock Endangered
Arrowgrass	All	All
Chokecherry	All	All, especially sheep
Death camas	Early spring	All, especially sheep
Greasewood	Spring	All, but mostly sheep
Halogeton	Fall and winter	All, but mostly sheep
Horsebrush	Spring	Sheep
Horsetail	Haying season	All, especially cattle and horses
Low larkspur	Early spring	Cattle
Tall larkspur	Early summer	Cattle
Loco	All, especially spring	All
Lupine	Summer	Sheep
Prince's plume	Spring and summer	All
Senecio	Spring and summer	All
Woody aster	Spring and summer	All

SOURCE: Laurence A. Stoddart, Arthur D. Smith, and Thadis W. Box, *Range Management.* Third ed. (New York: McGraw-Hill, 1975).

Rare Plants

No threatened or endangered plant species are known to exist in the planning area; however, two species have been proposed for threatened or endangered status. One of these, persistent sepal yellowcress, is a species restricted to old shorelines of rivers, ponds, and lakes. Fifteen populations of persistent sepal yellowcress have been located along Seminoe Reservoir and the Medicine Bow River, in the north central portion of the planning area. A large, but undetermined, part of the population around Seminoe Reservoir is on land administered by the Bureau of Reclamation. (Scientific names of rare plants in the planning area are listed in table 19.)

TABLE 19

RARE PLANTS IN THE PLANNING AREA

Common Name	Scientific Name
MUDDY GAP-WHISKEY GAP ENDEMIC CUSHION PLANT COMMUNITY	
Endemic Species	
Bun milkvetch	*Astragalus simplicifolius*
Wyoming locoweed	*Oxytropis nana*
White-flowered twinpod	*Physaria eburniflora*
Near-Endemic Species	
Summer orophaca	*Astragalus hyalinus*
Wyoming miner's candle	*Cryptantha stricta*
CATEGORY 2 SPECIES IN THE PLANNING AREA[1]	
Gibben's beardtongue[2]	*Penstemon gibbensii*
Persistent sepal yellowcress[3]	*Rorippa calycina*

[1] "Category 2" is the U.S. Fish and Wildlife Service classification for a taxonomic group for which current information indicates that proposed listing as endangered or threatened may be appropriate, but for which substantial data on biological vulnerability and threat(s) are not known or on file to support the immediate preparation of rules. Further biological research and field study usually are needed for plants in this category.

[2] A population of this species is known to exist in the southwest part of the planning area.

[3] Populations of this species are known to exist near Seminoe Reservoir.

Habitat requirements for this species were derived from its apparent specificity for sandy areas along rivers, ponds, and reservoirs. The species is found to be most abundant where the area has not been disturbed recently; that is, along shores of reservoirs constructed in the past 20 years. The soils may range from alkaline to nonalkaline and from loose to tight sand and clay. The largest populations are found in loose, nonalkaline, sandy littoral edges.

Even though large populations of persistent sepal yellowcress occur at Seminoe Reservoir, this species still remains a candidate for the threatened list. Increased volumes of water at Seminoe in the future may affect it. Populations on the east side of Seminoe Reservoir are near the Hanna coalfields. The U.S. Fish and Wildlife Service intends to study this species further (J. Miller 1982).

Gibben's beardtongue is apparently restricted to about 10 acres of a single slope of selenium soil in the N½NW¼ of section 10, T. 12 N., R. 94 W., in the vicinity of Cherokee Creek. The selenium soil is a sandy clay derived largely from a sandstone formation, yellowish in color and mostly devoid of vegetation.

In the past, the Gibben's beardtongue population was grazed by cattle and/or mule deer. The area was fenced to protect the population in 1985, and permanent photo and trend plots were established to monitor the species response. Gibben's beardtongue is considered endangered because of the low population number, significant grazing on the plants, and the lack of vigor in the population.

The site of the Gibben's beardtongue has a high potential for oil and gas. There are no mining claims on the site, and the potential for other minerals is low.

A unique plant community known as the Muddy Gap-Whiskey Gap endemic cushion plant community is also found in the planning area. This community is composed of either endemic or near-endemic plant species. Most of the species are cushion plants and nearly all are endemics. This is only the second known high-quality site like this in the state-the other is about 10 miles northeast of Kemmerer. The list of known endemics or near-endemics is as follows: endemics (known only from Wyoming) are bun milkvetch, Wyoming locoweed, and white-flowered twinpod; and near-endemics (known from Wyoming and only one other state) are summer orophaca and Wyoming miner's candle.

This mostly endemic cushion plant community occupies approximately 100 acres on a limestone formation at the west end of the Ferris Mountains. This area is part of the Wyoming Basin, which is a high, cold desert. The typical strong winds and harsh weather, in combination with the geologic characteristics, have contributed to the development of this community. These types of species are unique to the state's flora because they represent species that evolved to the local climatic and geologic conditions. In conjunction with the uniqueness of these species, their ability to form endemic cushion plant communities is also highly unusual.

Any type of surface disturbance such as roads, pipelines, and energy exploration or development could threaten this community. The plant community lies within a grazing allotment, but the potential effect of grazing is not known. The limestone formation that the community grows on may contain high enough quality limestone to qualify for location under the 1872 mining law. The potential for other minerals in this area is low.

Ecological Condition and Trend

General Information

Ecological condition is the present state of vegetation of the range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site.

Ecological condition is basically a relative rating of the plant community. There are four condition classes that indicate the condition of vegetation on a range site in relation to potential natural vegetation that could grow there. Range is in excellent condition if 76% to 100% of the vegetation is the same kind and amount as that in the climax stand, good condition if the percentage is 51 to 75, fair condition if the percentage is 26 to 50, and poor condition if the percentage is 25 or less (USDA, SCS 1976).

Although the climax plant community is the natural terminus of the successional process, it may not be the most desirable, given the objectives of a proposed plan. In some cases it may be preferable to manage for a condition (seral stage) somewhere below climax with a percentage of plant composition that is better suited for the proposed use.

Ecological condition is the current state of health of the range; trend is the direction in which condition is moving. An upward trend indicates an improving range condition; a downward trend indicates a deteriorating range condition; and a stable trend indicates no discernible change in condition.

Rangeland Vegetation Condition

Current information on vegetation ecological condition and trend is available for only a portion of the Medicine Bow grazing EIS area. BLM personnel completed an ecological site inventory in 1986 on 63 grazing allotments using the ecological site inventory method (USDA, SCS 1976; USDI, BLM 1984c).

The best available condition information for the remainder of the Medicine Bow grazing EIS area is the 1962 Missouri River Basin range survey, which used an ocular reconnaissance inventory method. No trend information was calculated or estimated with either survey method. For purposes of this document, trend information was estimated with the use of the combined information from each of the two inventories for allotments that were surveyed in both the 1962 and 1986 range inventories.

For allotments that were not in the ecological site inventory area, estimates of vegetation trend were based on the professional judgment of the range staffs of the Medicine Bow and Divide resource areas. The procedure used to calculate the trend information for allotments within the ecological site inventory area can be found in the Livestock Grazing appendix.

Ecological range condition is excellent in 6.5% of the Medicine Bow grazing EIS area, good on 60.9%, fair on 31.4%, and poor on 1.2%. Estimated ecological condition and vegetation trend for the Medicine Bow grazing EIS area are shown by allotment in table LVGR-AP-2 in the Livestock Grazing appendix.

The following discussion explains the processes leading to the current unacceptable conditions and declining trends on some allotments or particular range sites as they relate to grazing history and successional processes in the Medicine Bow grazing EIS area.

With the advent of European settlement, plant communities changed in response to changes in grazing use from a roaming, migratory herd of wild animals to more sedentary herds of domestic livestock. Settlers brought in new species of both plants and animals, which resulted in reduced populations of native fauna.

Plant populations changed under the reduced native animal impact and the increased grazing pressure of domestic animals. The plants that were most palatable to domestic livestock declined in vigor and abundance and became minor elements in the plant community, while less palatable plants increased. Entire plant communities changed their composition, and brush and woody plants increased on many rangelands. Climax plants ultimately disappear as a result of vegetation retrogression induced by grazing. They leave first from the most accessible (and therefore most grazed) areas, and soon they are evident only under the protection of stout shrubs. Later even these disappear, often leaving nothing but annual invaders (Stoddart, Smith, and Box 1975).

Improper seasons of use also contribute to changes in plant communities. Laycock (1970) reported the effects of heavy spring grazing that damaged good condition ranges by reducing herbaceous production more than 50% and increasing sagebrush production by 78%. An understanding of the growth cycles of forage species is important to the goal of maintaining a sustained yield and to the development of sound grazing management systems. Varying the season of livestock use and allowing for periodic rest can improve vigor and production while maintaining the same level of use.

Shortages of adequate sources of spring forage contribute to the decrease in available forage and the decline in ecological condition. In the grazing EIS area, native ranges have been grazed repeatedly during the critical growth period, so that both the quality and the quantity of forage and cover have been reduced.

The critical growth period for most of the perennial grass species in the planning area is approximately early May through mid-July, with growth beginning generally by late April. This early growth uses carbohydrate root reserves stored the previous year during the critical growth period. By mid-July, an ungrazed plant replenishes its root reserves, although it will not complete its life cycle through the seed ripe stage until early August. If the plant is unable to replenish its root reserves because of moisture condition or grazing during the critical growth period, it will progress into winter dormancy with a deficit in its energy reserve. If this cycle is repeated year after year, the energy deficit increases until the plant can no longer maintain itself and dies.

In periods of drought even vigorous plants with adequate energy reserves are under severe stress. A plant going into a drought period with a severely depleted energy supply will be unable to survive.

Grazing of native ranges at more than recommended utilization levels (normally 50% of current production for grasses), even during the proper season of use, can have a detrimental impact on plant health and vigor. Improper utilization levels can result when grazing animals are allowed to remain in an area too long or when too many grazing animals are placed in a given area for a set period of time. These factors have contributed to less than satisfactory ecological conditions in the grazing EIS area.

Another factor leading to the current unacceptable condition and trend on many allotments is the original overestimation of range carrying capacity. Following the formation of the U.S. Grazing Service (which later became the Bureau of Land Management), public rangelands, historically used by domestic livestock since the mid to late 1800s, were inventoried and adjudicated to livestock operators who could show priority for the public land forage.

In many cases, lands were inadequately inventoried or were adjudicated with little or none of the area actually being surveyed. Many areas were rated solely on the basis of historical use, which in many cases was too high to maintain sustained production. In addition, areas that were less productive or inaccessible were given the same production ratings as other higher productive areas. This has resulted in a certain percentage of the Medicine Bow grazing EIS area showing a much higher availability of forage for livestock than actually exists. Therefore, some of these ranges have been overstocked and overused long enough to cause a loss of health and vigor of the plants and a resultant decline in ecological condition of the vegetative communities.

Riparian Vegetation Condition

Riparian areas make up less than 1% of the public land in the grazing EIS area, yet often they are the most heavily favored by livestock and wildlife. Riparian areas, which are directly associated with, and dependent on, a localized availability of water, produce a large quantity of quality forage in a relatively small area around or along the water source. This increased production of vegetation, along with the available water, provides an environment that naturally attracts and concentrates livestock.

The concentration of livestock along these favored areas has led to grazing pressure that often has been too heavy and too prolonged to maintain the riparian sites in good condition. Recreation, roads, livestock grazing, irrigation, and wildlife use all have contributed to impacts on these highly productive vegetation types.

The present ecological condition for riparian areas in allotments within the ecological site inventory area are shown in table 20.

TABLE 20

PRESENT ECOLOGICAL CONDITION OF RIPARIAN VEGETATION FOR ALLOTMENTS IN THE ECOLOGICAL SITE INVENTORY AREA

Allotment Number	Allotment Name	Ecological Condition (acreage)				
		Excellent	Good	Fair	Poor	Total
0302	Little Canyon Creek	—	—	7	—	7
0305	Camp Creek	—	—	3	—	3
0307	Bates Hole	—	3	37	—	40
0311	Bates Hole-Benchmark	—	—	54	—	54
0312	7 E Ranch	—	—	9	—	9
0315	Indian Springs	—	10	54	38	102
0316	Dry Creek Rim	—	—	2	63	65
0317	Upper Dry Creek	—	1	6	2	9
0318	Shirley Ridge	1	—	—	—	1
0321	Dry Creek	—	—	10	—	10
0322	Spring Creek	—	—	4	—	4
0323	Black Canyon	—	10	—	—	10
0324	Palmer-Nelson	—	—	268	—	268
0328	Sullivan	—	115	367	—	482
0334	Corral Creek	—	—	—	294	294
0335	Shirley Mountain	—	—	133	—	133
0811	Ellis Block	—	—	9	—	9
9030	Burnett Creek	—	—	111	—	111
Total		**1**	**139**	**1,074**	**397**	**1,611**

VISUAL RESOURCES

A wide variety of scenery is found in the planning area. The visual quality of an area is often as important a factor as anything else in determining an individual's choice of locations to engage in a recreation activity. The BLM's visual resource management (VRM) system is an analytical process that identifies, sets, and meets objectives for maintaining scenic values and visual quality.

Visual resource management classes are the degree of acceptable visual change within a characteristic landscape. A class is based on the physical and sociological characteristics of any given homogeneous area and serves as a management objective. The four classes are described below:

> **Class I** provides for natural ecological changes only. This class includes primitive areas, some natural areas, some wild and scenic rivers, and other similar areas where landscape modification activities should be restricted.

Class II areas are those where changes in any of the basic elements (form, line, color, or texture) caused by management activity should not be evident in the characteristic landscape.

Class III includes areas where changes in the basic elements (form, line, color, or texture) caused by a management activity may be evident in the characteristic landscape. However, the changes should remain subordinate to the visual strength of the existing character.

Class IV applies to areas where changes may subordinate the original composition and character; however, they should reflect what could be a natural occurrence within the characteristic landscape.

A total of 33,165 acres of BLM-administered public land in the planning area are in VRM Class I areas, 160,640 acres in Class II, 3,582,195 acres in Class III, and 224,000 acres in Class IV.

VRM classes for the planning area are depicted on map 43.

WILD HORSES

Three wild horse herd management areas (HMAs) are partially or entirely within the planning area: the Adobe Town, Flat Top, and Seven Lakes HMAs. All three are in the Divide and Seven Lakes grazing EIS areas. There are no wild horses in the Medicine Bow grazing EIS area (see map 44).

All of the Flat Top HMA lies within the planning area. Approximately 77% of the Adobe Town HMA lies within the planning area; the remaining 23% is in the Rock Springs District. About 70% of the Seven Lakes HMA lies within the planning area; the remaining 30% is in the Lander Resource Area. Two separate herds, the Cyclone Rim herd and the Stewart Creek herd, occupy the part of the Seven Lakes HMA that is within the planning area.

The general condition and health of the horses appear to be good. Wild horses in the planning area generally can be viewed in a natural setting unmarred by intrusions of human origin. These horses are probably descendants of horses that escaped from, or were released by, local ranchers.

No crucial habitat for wild horses has been identified in the planning area. Wild horses graze on all vegetation types within their range. One factor limiting the movements of wild horses is the availability of water.

Richard Miller (1983) found that in the Red Desert, approximately 20 miles northwest of the planning area, horses were generally within 3.0 miles of water sources during the summer. Although horse distribution and habitat use is affected by water availability, horses are more wide-ranging than cattle and less tied to water (National Research Council 1982).

During the winter, habitat selection is more likely to be influenced by forage availability. Horses are able to consume snow and are not dependent on areas near water sources when snow is available. Areas distant from water sources that are not used during the summer are more likely to have forage available during the winter. Richard Miller (1983) said ridges provide both cover and forage for wild horses during the winter. More forage is available near the tops of ridges, which are blown clear of snow.

In recent years, conflicts between wild horses and other resource uses have been minimal. There is virtually no habitat damage resulting from overuse by wild horses. Uses such as oil and gas activity, hunting, and ORV use are having virtually no effect on wild horse population size or on distribution and habitat use.

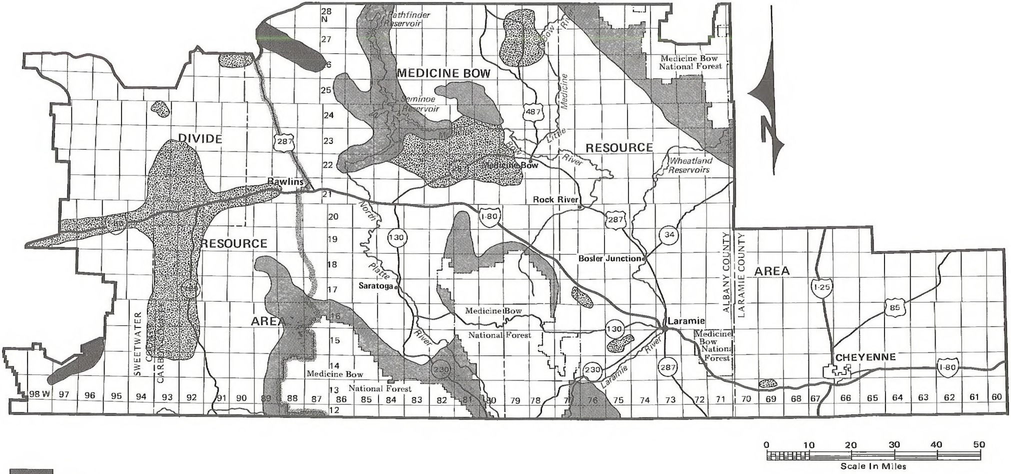
WILDLIFE AND FISHERIES

Wildlife

Introduction

There are many wildlife populations and habitats throughout the planning area. Analysis of various management alternatives for each of the major resource issues indicates that some wildlife populations and habitats could be affected by one or more of the management alternatives. Wildlife resources that could be affected are described under one of the following categories: wildlife habitat, big game, upland game birds, raptors, waterfowl and shorebirds, other migratory bird species of note, threatened and endangered species, furbearers, predators, and trophy game.

With the use of sampling transects, casual observations, information from other agencies, and literature sources, more than 374 vertebrate species have been documented in the part of the planning area that is west of the North Platte River. A computer listing of these species and their 26 habitat types is available at the Divide Resource Area office.



▓ Class I

▒ Class II

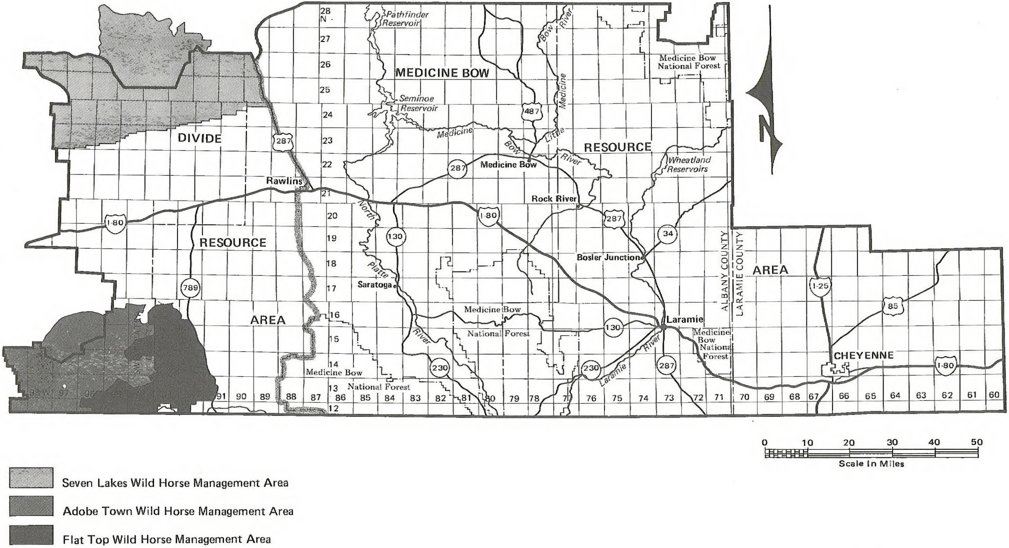
☐ Class III

░ Class IV

Map 43

VISUAL RESOURCE MANAGEMENT CLASSES

Medicine Bow-Divide Resource Management Plan



Map 44

WILD HORSE MANAGEMENT AREAS

Medicine Bow-Divide Resource Management Plan

Because of abundance, high adaptability, very low density, wide-ranging habits, or affinity for impact-resistant, unaffected, or abundant habitats, many wildlife species would be virtually unaffected by the types of management alternatives being considered. Such species or groups will not be discussed in this document. Other species will not be discussed because of inadequate inventory data, lack of information necessary to predict effects, or low public interest. Species that will not be discussed are amphibians, coyotes, reptiles, bobcats, most songbirds, fox, bats, mourning doves, mice and voles, rabbits and hares, ground squirrels, red squirrels, most furbearing mammals, most small predatory mammals, nongame fishes, and warm-water fishes.

Standard habitat types are described because effects on the habitats can affect the wildlife species that use them.

Maps 45 and 46 indicate current cooperative agreement areas and areas that are under existing HMPs or are proposed for HMPs. Tables 21 and 22 show management priorities by species for cooperative agreement areas and for existing and proposed HMP areas.

TABLE 21

MANAGEMENT PRIORITY BY SPECIES AND HMP AREA OR COOPERATIVE AGREEMENT AREA

	HMP Areas						Cooperative Agreement Areas			
Species	Baggs	Ferris-Seminoe	Shirley Mountain	Sage Creek Basin	Encampment Bighorn Sheep	Red Desert	Wick Elk Winter Area	Pennock Mountain Elk Winter Range	Laramie Peak Game Winter Range	Sybille Winter Deer Pasture
Elk	HP	HP	HP	—	P	—	P	P	P	P
Mule deer	P	P	P	P	P	P	—	—	p	p
Antelope	P	P	P	—	—	P	—	—	P	P
Bighorn sheep	—	HP	—	—	HP	—	—	—	—	—
Raptors	HP	HP	—	HP	—	HP	—	—	—	—
Colorado River cutthroat trout	HP	—	—	—	—	—	—	—	—	—
Waterfowl	P	P	P	P	—	HP	—	—	—	—
Bald eagles	HP	P	—	—	—	—	—	—	—	—
Peregrine falcon	—	P	—	—	—	—	—	—	—	—
Black-footed ferret	HP	HP	HP	HP	—	P	—	—	—	—

NOTE: HP = high priority species for this management area; P = priority species for this management area.

TABLE 22

MANAGEMENT PRIORITY BY SPECIES FOR ADDITIONAL HMP AREAS PROPOSED UNDER ALTERNATIVES C AND D

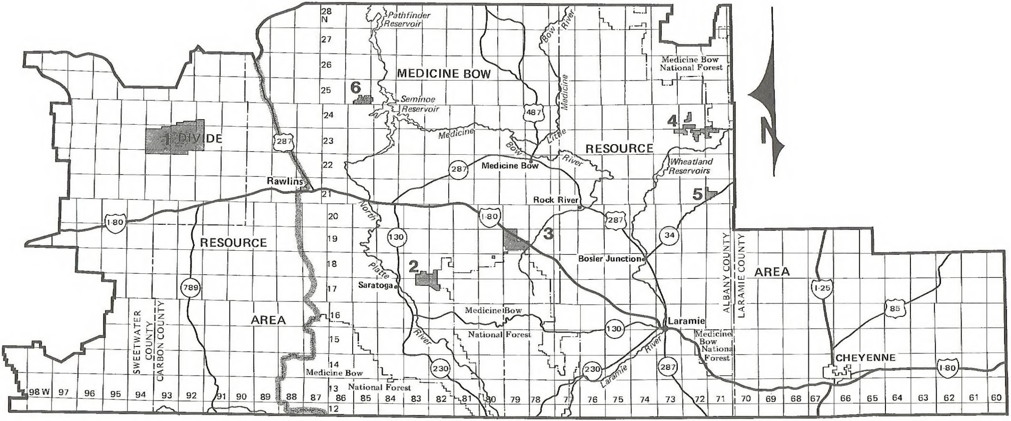
Species	South Desert	Saratoga Valley	Laramie Peak	Jelm Mountain
Elk	—	P	P	HP
Mule deer	HP	P	P	HP
Antelope	P	P	P	P
Bighorn sheep	—	HP	HP	—
Raptors	HP	HP	—	—
Waterfowl	P	P	P	P
Bald eagles	—	P	—	—
Black-footed ferret	HP	HP	—	—

NOTE: HP = high priority species for this management area; P = priority species for this management area.

Wildlife Habitat

The planning area contains many diverse wildlife habitats. During 1981, the Divide Resource Area was categorized into 26 standard habitat sites. (A report describing these sites is available for review at the office of the Medicine Bow and Divide resource areas.) Each standard habitat site has a unique vegetative composition and structure and supports a predictable wildlife community.

The Medicine Bow Resource Area has not been categorized into standard habitat types, but it contains many of the same habitat types found in the Divide Resource Area. Three additional high priority habitats may be delineated for the Medicine Bow Resource Area: Platte Valley rockland, Laramie Peak rockland, and wet forested meadow.



▨ Existing Cooperative Agreement Management Areas

▨ Proposed Cooperative Agreement Management Areas

0 10 20 30 40 50

Scale In Miles

1 Chain Lakes

2 Pennock Mountain Elk Winter Range

3 Wick Bros. Elk Winter Area

4 Laramie Peak Game Winter Range

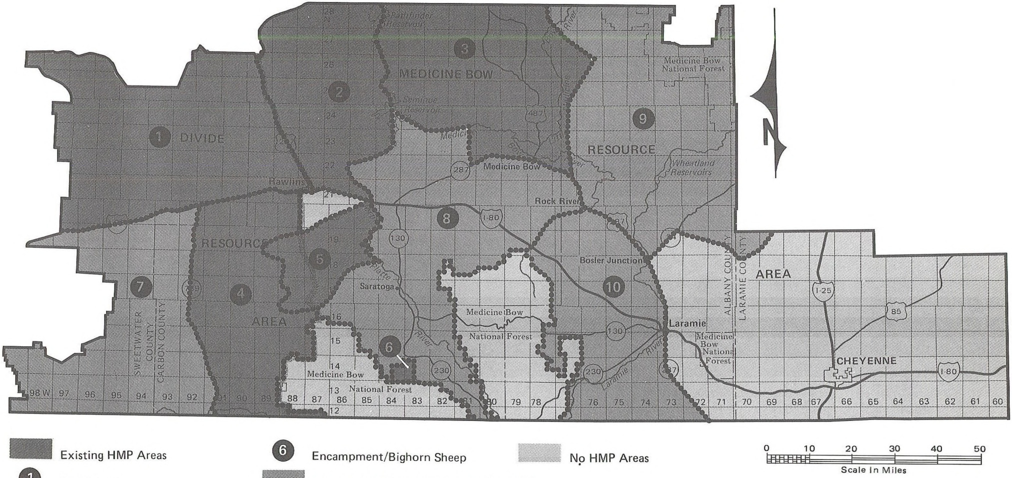
5 Sybille Winter Deer Pasture

6 Dune Pond (Alt. B,C,D)

Map 45

COOPERATIVE AGREEMENT MANAGEMENT AREAS

Medicine Bow-Divide Resource Management Plan



▨ Existing HMP Areas

① Red Desert

② Ferris/Seminoe

③ Shirley Mountains

④ Baggs

⑤ Sage Creek

⑥ Encampment/Bighorn Sheep

▨ Proposed HMP Areas (Altnative C and D)

⑦ South Desert

⑧ Saratoga Valley

⑨ Laramie Peak

⑩ Jelm Mountains

▨ No HMP Areas

Map 46

EXISTING AND PROPOSED HMP AREAS

Medicine Bow-Divide Resource Management Plan

Vegetative types and subtypes have been combined with standard habitat types for the planning area in table 17 in the "Vegetation" section of this chapter to describe the vegetation as it relates to wildlife habitat for the entire planning area. Acreage estimates by vegetative type or standard habitat type have not been computed for the planning area.

Habitat types that provide diverse structural vegetation (such as cottonwood floodplains, aspen-conifer woodlands, and lodgepole pine forests) support a great diversity of wildlife because of the large number of sites that can be used for reproduction and/or feeding.

Habitat types associated with running and standing water (for example, wetlands, subirrigated meadows, and willow-waterbirch riparian) also support a large number of wildlife species. These wetland/riparian habitats are important to many migrant species as well as to a diverse population of seasonal resident species. The diverse plant composition and structure provided by these habitats support wildlife numbers and diversity several times greater than the surrounding upland sites. All riparian habitat types share the following characteristics: (a) they create well-defined habitat zones within the drier surrounding areas; (b) they make up a minor proportion of the surrounding area; (c) they are more productive in terms of plant and animal biomass; and (d) they are a critical source of diversity within the rangelands (USDA, FS 1980).

The woodland and forest habitats provide many of the same types of structural layers as the wetland/riparian sites. However, because of the absence of open water, wildlife species diversity is usually less than that found in the riparian areas.

Shrublands lack the tree canopy of the forest and woodland sites, which reduces the total number of wildlife species that use these types. Still, the various shrub types support a fairly diverse population of wildlife species and provide key wintering habitat for a large number of big game animals. The big sagebrush-rabbitbrush steppe, bitterbrush-sagebrush steppe, and mountain shrubland make up a large percentage of the big game wintering habitat.

The 26 standard habitat sites in the Divide Resource Area have been ranked by management priority into three categories as shown on table 23. Table 23 also lists three additional habitat types proposed for delineation in the Medicine Bow Resource Area. The habitat types that usually support a large number of wildlife species are not common in the planning area.

Although moderate-priority habitats usually are of lesser importance to wildlife and normally are in greater supply than high-priority habitats, they require sound management to ensure maintenance or improvement of the vegetative composition and structure.

Low-priority habitats usually have a reduced vegetative diversity, with only one or two structural layers. These types can be more heavily used by conflicting resources without causing significant wildlife impacts because of their abundance and lower wildlife value.

Big Game

Five species of big game mammals are residents of the planning area: elk, mule deer, pronghorn antelope, bighorn sheep, and white-tailed deer. The location of the herd unit area boundaries for each big game species is shown on maps 47 through 51. Crucial and important ranges and habitat areas for big game are shown on maps 52 through 55.

Table 24 shows statistics for each big game herd such as population objective, acreage of habitat in the planning area, and acreage of high-value habitat. The right column of this table indicates the BLM habitat management plans that apply to each area (see maps 45 and 46).

Domestic livestock graze in all the herd unit areas. The extent of grazing and its impact on big game species vary throughout the resource area. Wild horses compete for forage with other grazing animals mainly in the Baggs and Red Desert HMP areas and the proposed South Desert HMP area.

The opportunity exists to improve wildlife habitat through prescribed burns and innovative methods of fire suppression in all the HMP areas except the Red Desert and South Desert HMP areas, where vegetation generally is too sparse to sustain a fire.

The following narrative describes the general habitat requirements of each big game species and identifies HMP areas and cooperative agreement areas where specific big game management practices are currently taking place. General management statements are made where they are definable. Where data are inadequate, determination of management objectives is reserved.

TABLE 23

RANKING OF STANDARD HABITAT TYPES

Priority[1]		
High	Moderate	Low
Open aquatic	Greasewood-sagebrush riparian	Short grasslands
Riparian grassland	Big sagebrush-rabbitbrush	Saltbush steppe
Willow-waterbirch riparian	Bitterbrush	Greasewood
Aspen riparian	Sagebrush-mixed grass	Badland (DIV)[3]
Cottonwood riparian	Silver sagebrush steppe	True sand dunes
Mountain shrub	Lodgepole pine	Upland meadows
Utah juniper	Limber pine (MB)[2]	
Quaking aspen	Early successional conifer	
Aspen conifer	Rockland (MB)[2]	
Ponderosa pine-Douglas-fir	Saline subirrigated grassland	
Platte Valley rockland[4]		
Laramie Peak rockland[4]		
Wet forested meadow[4]		

NOTE: Ranking is based on the wildlife communities (total species, number of breeders, number of rare species) combined with the availability of each type.

[1] High-priority habitats are those that require intensive management actions (data collection, enhancement, protection) to maintain their productivity as diverse wildlife communities; moderate-priority habitats are those that require less intensive management to maintain their productivity as wildlife communities; low-priority habitats are those that can be more heavily used by conflicting resources so that the higher priority wildlife habitats can be maintained.

[2] Found only in the Medicine Bow Resource Area.

[3] Found only in the Divide Resource Area.

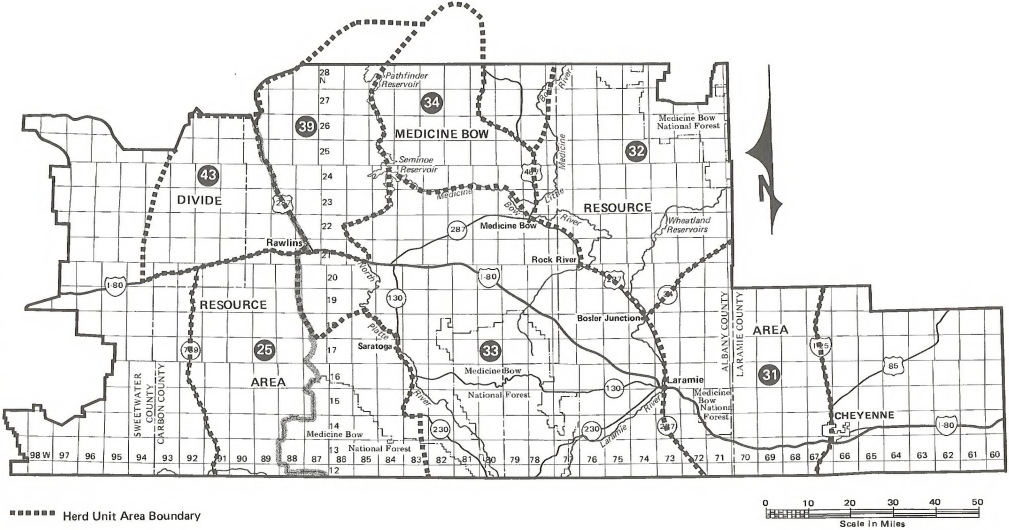
[4] These additional high-priority habitat sites may be delineated for the Medicine Bow Resource Area.

Elk

A variety of standard habitat types provide the seasonal requirements for several herds of elk in the planning area. Habitat selection varies from season to season, with the elk being most restricted during severe winter conditions. Elk require a combination of feeding sites (upland meadow, sagebrush-mixed grass, and mountain shrub), security, and thermal cover (aspen and conifer woodlands) for their daily activity.

During the summer, elk use the higher elevation woodland types for security and thermal cover. The upland meadows and sagebrush-mixed grass sites provide summer forage.

With the onset of winter, the elk migrate to the lower elevation winter ranges, concentrating on the crucial winter ranges during periods of severe weather. Snow depths limit elk to the more open, windswept areas, usually consisting of sagebrush-mixed grass, big sagebrush-rabbitbrush, and some mountain shrub communities.



■■■■■■ Herd Unit Area Boundary

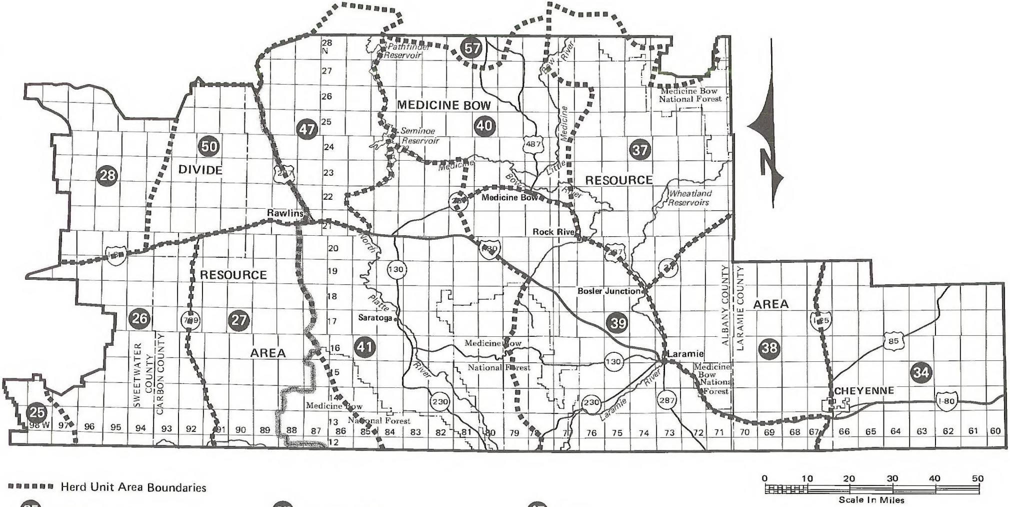
HERD UNIT NUMBER/NAME

25	Baggs
31	Iron Mountain
32	Laramie Peak
33	Snowy Range
34	Shirley Mountain
39	Ferris
43	Shamrock

Map 47

ELK HERD UNIT AREA BOUNDARIES

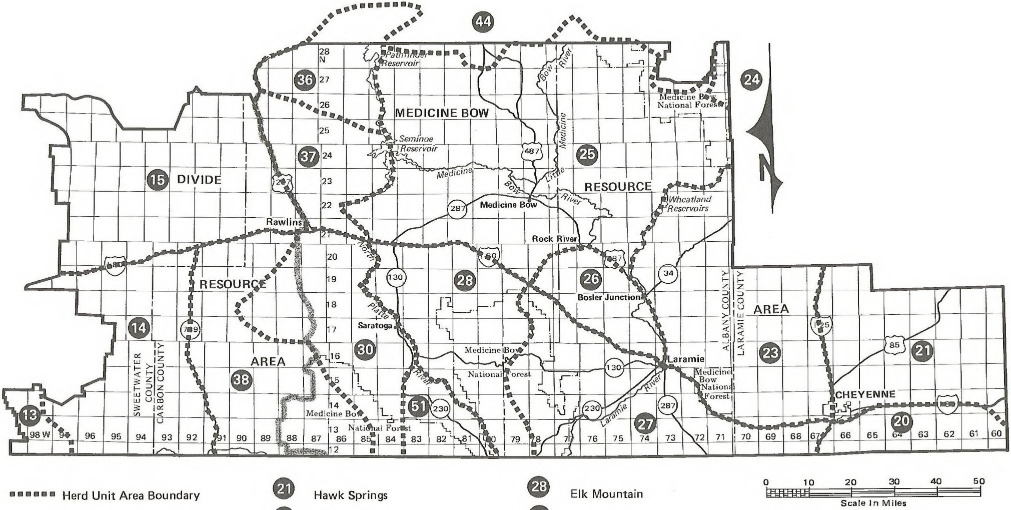
Medicine Bow-Divide Resource Management Plan



▪▪▪▪▪▪ Herd Unit Area Boundaries

25	Black Butte
26	South Wamsutter
27	Baggs
28	Table Rock
34	Cheyenne
37	Laramie Peak
38	Iron Mountain
39	Sheep Mountain
40	Shirley Mountain
41	Platte Valley
47	Ferris
50	Chain Lakes
57	Bates Hole

Map 48
MULE DEER HERD UNIT AREA BOUNDARIES
Medicine Bow-Divide Resource Management Plan

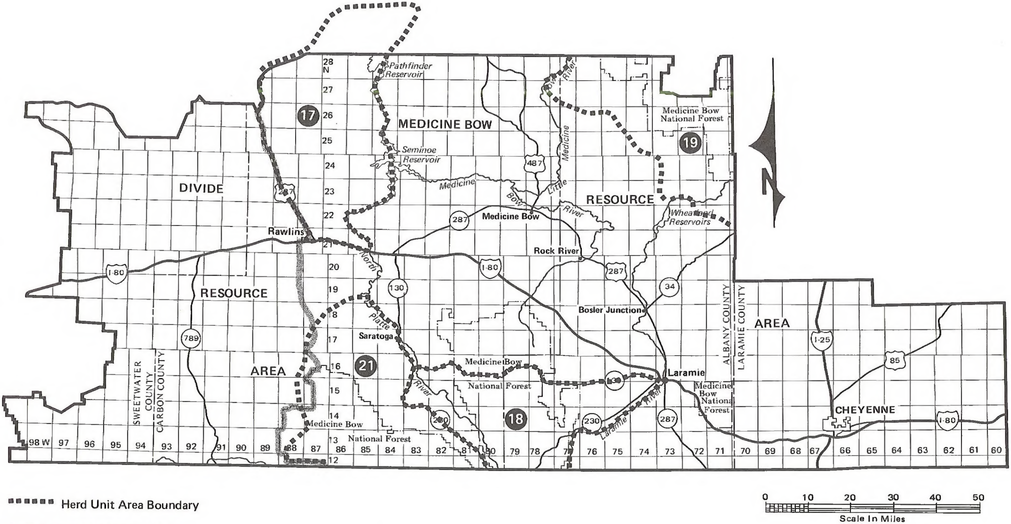


Herd Unit Area Boundary

HERD UNIT NUMBER/NAME

⑬ Black Butte
⑭ South Wamsutter
⑮ Red Desert
⑳ Chalk Bluffs
㉑ Hawk Springs
㉓ Iron Mountain
㉔ Dwyer
㉕ Medicine Bow
㉖ Cooper Lake
㉗ Centennial
㉘ Elk Mountain
㉚ Iron Springs
㊱ North Ferris
㊲ South Ferris
㊳ Baggs
㊹ Bates Hole
(51) Big Creek

Map 49
ANTELOPE HERD UNIT AREA BOUNDARIES
Medicine Bow-Divide Resource Management Plan



■■■■■■ Herd Unit Area Boundary

HERD UNIT NUMBER/NAME

⑰ Ferris

⑱ Douglas Creek

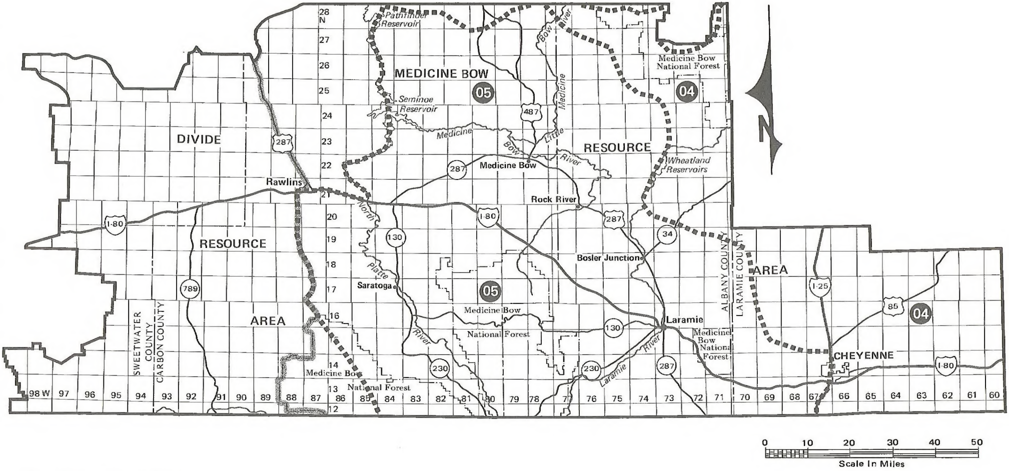
⑲ Laramie Peak

㉑ Encampment

Map 50

BIGHORN SHEEP HERD UNIT AREA BOUNDARIES

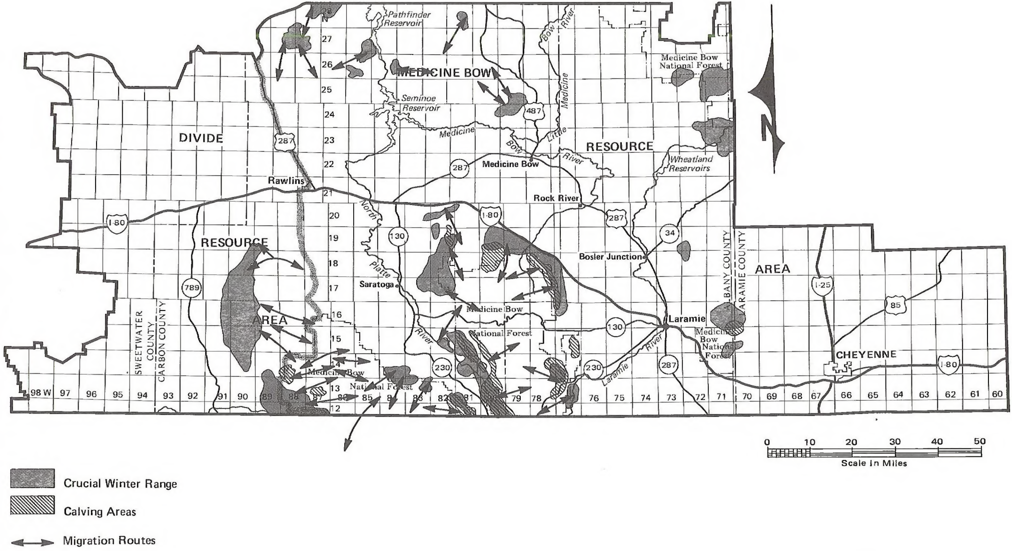
Medicine Bow-Divide Resource Management Plan



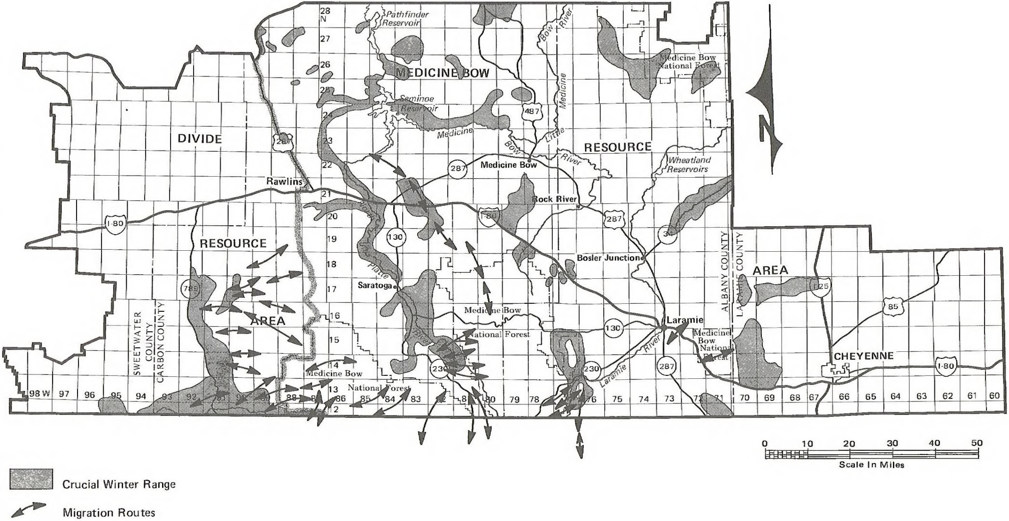
Map 51

WHITE-TAILED DEER HERD UNIT AREA BOUNDARIES

Medicine Bow-Divide Resource Management Plan



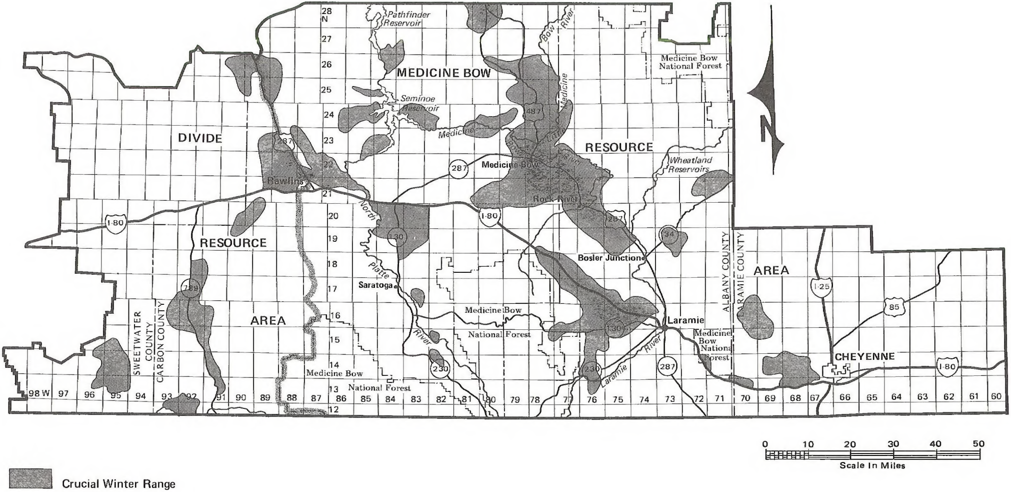
Map 52
ELK HABITAT
Medicine Bow-Divide Resource Management Plan



Map 53

MULE DEER CRUCIAL WINTER RANGE AND MIGRATION ROUTES

Medicine Bow-Divide Resource Management Plan

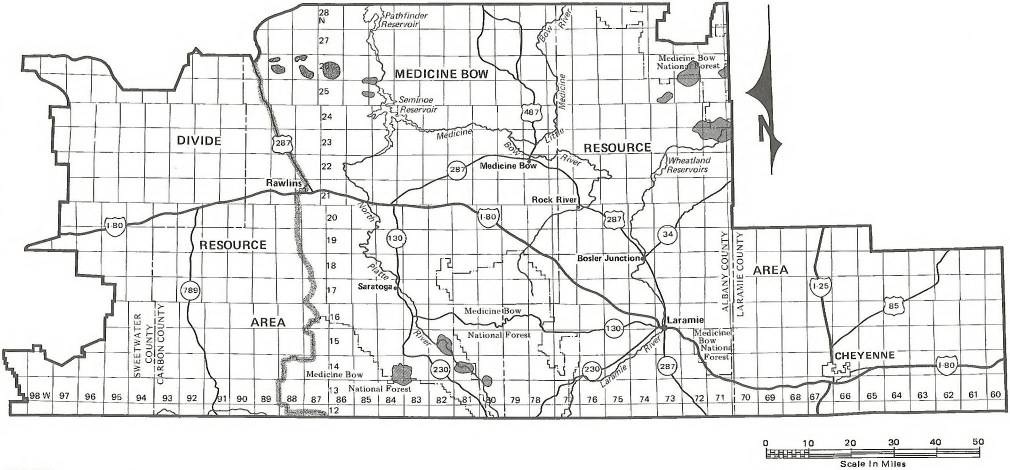


▨ Crucial Winter Range

Map 54

ANTELOPE CRUCIAL WINTER RANGE

Medicine Bow-Divide Resource Management Plan



▨ Crucial Winter Range

▨ Historical Winter Range

Map 55

BIGHORN SHEEP CRUCIAL WINTER RANGE

Medicine Bow-Divide Resource Management Plan

TABLE 24

BIG GAME HERD UNIT AREA DATA

Herd Unit Area Name and Number	WGFD Population Objective	Approximate Percentage of Population in Planning Area	Acreage of Occupied Habitat in Planning Area	Acreage of Crucial Habitat Potentially Affected[1]	HMPs in Herd Unit Area
Antelope					
Big Creek (No. 29)	100	100 (w) 10 (s)	640	0	Encampment Saratoga Valley
Centennial (No. 27)	5,000	100 (y)	6,400	5,000	Jelm Mountain
Chalk Bluffs (No. 20)	450	100 (y)	0	0	None
Cooper Lake (No. 26)	2,000	100 (y)	12,160	12,160	Jelm Mountain
Dwyer (No. 24)	1,600	5 (y)	0	0	Laramie Peak
Elk Mountain (No. 28)	3,000	100 (y)	26,520	25,000	Saratoga Valley
Hawk Springs (No. 21)	5,000	40 (y)	0	0	None
Iron Mountain (No. 23)	6,000	95 (y)	1,280	0	Laramie Peak
Medicine Bow (No. 25)	20,000	100 (y)	110,040	91,260	Shirley Mountain Laramie Peak Saratoga Valley
Iron Springs (No. 30)	8,000	100 (y)	0	0	Saratoga Valley Sage Creek Basin
North Ferris (No. 36)	5,000	80 (s) 10 (w)	0	0	Ferris-Seminoe
South Ferris (No. 37)	6,500	100 (y)	31,360	19,990	Ferris-Seminoe
Red Desert (No. 15)	10,000	85 (w) 60 (s)	57,600	96,700[2]	Red Desert
Baggs (No. 38)	7,200	100 (w) 90 (s)	53,120	50,200	Baggs
South Wamsutter (No. 14)	7,000	80 (w) 100 (s)	72,300	72,300	South Desert Baggs
Black Butte (No. 13)	4,000	5 (y)	0	0	South Desert
Bates Hole (No. 44)	6,000	10 (w) 5 (s)	8,960	8,960	Shirley Mountain
Bighorn Sheep					
Douglas Creek (No. 18)	350	75 (w) 50 (s)	3,060	2,360	Saratoga Valley
Encampment River (No. 21)	200	90 (w) 10 (s)	7,060	7,060	Encampment Saratoga Valley
Laramie Peak (No. 19)	600	60 (y)	11,520	0	Laramie Peak

TABLE 24 (Continued)

BIG GAME HERD UNIT AREA DATA

Herd Unit Area Name and Number	WGFD Population Objective	Approximate Percentage of Population in Planning Area	Acreage of Occupied Habitat in Planning Area	Acreage of Crucial Habitat Potentially Affected[1]	HMPs in Herd Unit Area
Ferris (No. 17)	300	100 (y)	800	800	Ferris-Seminoe
Elk					
Iron Mountain (No. 31)	75	90 (y)	250 60 (elk calving)	0	Laramie Peak
Laramie Peak (No. 32)	2,300	50 (y)	15,400	0	Laramie Peak
Shirley Mountain (No. 34)	800	80 (y)	13,500	7,800	Shirley Mountain
Snowy Range (No. 33)	4,000	80 (w) 5 (s)	26,350 6,240 (elk calving)	12,725	Saratoga Valley Jelm Mountain Shirley Mountain
Baggs (No. 25)	4,200	90 (w) 10 (s)	83,670 2,560 (elk calving)	78,720 2,560 (elk calving)	Baggs Saratoga Encampment Sage Creek
Ferris (No. 39)	350	98 (y)	25,300	0	Ferris-Seminoe
Shamrock (No. 43	75	100 (y)	0	0	Red Desert
Green Mountain[3] (No. 38)	375	0	0	0	Baggs
Mule Deer					
Cheyenne (No. 34)	2,300	80 (y)	0	0	None
Iron Mountain (No. 38)	11,600	80 (y)	6,400	0	Laramie Peak
Laramie Peak (No. 37)	14,000	60 (y)	10,400	0	Laramie Peak
Platte Valley (No. 41)	15,000	90 (w) 50 (s)	59,730	24,860	Encampment Sage Creek Basin Saratoga Valley
Sheep Mountain (No. 39)	10,000	90 (w) 60 (s)	12,800	950	Jelm Mountain
Shirley Mountain (No. 40)	5,200	100 (y)	58,300	17,180	Shirley Mountain
Ferris (No. 47)	5,000	90 (y)	42,800	21,080	Ferris-Seminoe
Baggs (No. 27)	17,000	99 (w) 75 (s)	74,240	69,200	Baggs
Chain Lakes (No. 50)	200	99 (y)	0	0	Red Desert

TABLE 24 (Continued)
BIG GAME HERD UNIT AREA DATA

Herd Unit Area Name and Number	WGFD Population Objective	Approximate Percentage of Population in Planning Area	Acreage of Occupied Habitat in Planning Area	Acreage of Crucial Habitat Potentially Affected[1]	HMPs in Herd Unit Area
South Wamsutter (No. 26)	2,700	100 (y)	57,600	57,600	South Desert
Table Rock (No. 28)	450	40 (y)	0	0	Red Desert
Black Butte (No. 25)	1,750	5 (y)	0	0	South Desert
Bates Hole (No. 57)	12,000	5 (y)	7,770	7,700	Shirley Mountain
Green Mountain (No. 46)	2,000	2 (y)	0	0	Red Desert

NOTE: (s) = summer; (w) = winter; (y) = yearlong.

[1] Acreage listed is crucial habitat that has the potential to be significantly affected by one or more of the resource management alternatives analyzed in this document.

[2] Includes 50,000 acres of summer/yearlong habitat.

[3] Area 38 is in the planning area, but elk populations probably do not enter the planning area.

The following HMP areas and other management areas provide habitat of major importance to elk herds in the planning area. The acreage of elk crucial winter range on public land is presented in table 25.

Baggs HMP Area. The Baggs HMP Area provides summer, winter/yearlong, calving, and crucial winter range habitat for the majority of the Baggs elk herd, approximately 3,200 elk. Elk that utilize the Baggs crucial winter range migrate annually from Miller Hill, the Sierra Madre, and the Medicine Bow National Forest on the east, and from Colorado on the south. Most of the calving areas are on the Medicine Bow National Forest. Maintenance of adequate cover and feeding habitat on the crucial winter range is a primary wildlife objective. Another objective is to minimize disruption of travel corridors and migration routes. Currently, seasonal stipulations are used to reduce stress and disturbance from energy-related activities during critical periods on crucial winter range and calving areas.

Coal mining, livestock grazing, ORV use, and oil, gas, and uranium exploration and development can potentially create conflicts with elk management.

Ferris-Seminoe HMP Area. The Ferris-Seminoe HMP Area provides summer, winter/yearlong, and crucial winter range for the Ferris elk herd, approximately 424 elk. Migration from the seasonal ranges in the Ferris Mountains is generally to and from the crucial winter ranges north of the Ferris Mountains. Migrations from seasonal ranges in the vicinity of Bradley Peak (southeast of the Ferris Mountains) is generally to the crucial winter ranges southwest of the lower portions of Pathfinder Reservoir. Calving areas have not been determined.

A primary objective of wildlife management is maintenance or improvement of winter and crucial winter range cover, which is limited to riparian habitat sites along drainages and to scattered stands of aspen and conifer. Currently, seasonal stipulations are used to reduce stress and disturbance from energy-related activities on crucial winter range during critical periods.

Livestock grazing and oil, gas, and locatable mineral exploration and development can potentially create conflicts with elk management, depending on the intensity of the livestock grazing or mineral activities.

TABLE 25

ACREAGE OF HABITAT IMPORTANT TO WILDLIFE SPECIES IN THE PLANNING AREA BY HMP AREA

HMP Area	Elk Crucial Winter Range	Elk Calving Areas	Mule Deer Crucial Winter Range	Antelope Crucial Winter Range	Bighorn Sheep Crucial Winter Range	Sage Grouse Nesting Areas (Number of Leks)	Raptor Concentration Areas
Baggs	78,720	2,560	74,240	50,120	—	160,500 (28)	29,900
Ferris-Seminoe	25,300	—	42,800	31,360	800	98,600 (16)	22,240
Shirley Mountain	13,500	—	66,400	83,800	—	105,000 (25)	—
Sage Creek Basin	—	—	3,100	—	—	12,400 (2)	8,000
Encampment Bighorn Sheep	4,950	—	5,800	—	7,060	—	—
Red Desert	—	—	—	57,600	—	237,400 (39)	17,280
South Desert	—	—	57,600	72,300	—	43,800 (7)	15,770
Saratoga Valley	21,150	3,360	49,300	54,600	3,060	195,000 (50)	5,440
Laramie Peak	15,400	—	10,400	7,100	11,520	49,700 (15)	—
Jelm Mountain	5,200	2,880	5,100	19,500	—	14,400 (4)	—
Other	250	60	15,300	1,000	—	2,900 (0)	1,690
Total	**164,470**	**8,860**	**330,040**	**377,380**	**22,440**	**919,700 (186)**	**100,320**

Shirley Mountain HMP Area. The Shirley Mountain HMP Area provides summer, yearlong, winter, and crucial winter range for approximately 500 elk. Crucial winter ranges are around Chalk Mountain, on the south side of the Freezeout Mountains, and just southeast of Miracle Mile. The elk migrate annually between these crucial winter ranges and seasonal ranges (summer, yearlong) on Shirley Mountain and the Freezeout Mountains. Maintenance of adequate cover, as part of the Shirley Mountain forest ecosystem, is a primary wildlife objective. Currently, small tracts of merchantable timber stands are logged until a cover-forage ratio of approximately 40% to 60% has been reached.

Livestock grazing, access, and mountain pine beetle infestations requiring intensive silvicultural control measures can potentially create conflicts with elk management, depending on their intensity.

Encampment Bighorn Sheep HMP Area. The Encampment Bighorn Sheep HMP area provides winter/yearlong and crucial winter range for approximately 200 elk. Primary wildlife objectives are maintenance or improvement of adequate forage and cover for wintering elk and reduction of competition with livestock and other big game species. At present, seasonal stipulations are used to reduce stress and disturbance from energy-related activities on crucial winter range during critical periods.

Livestock grazing, other big game use, mineral exploration and mining, and ORV use can potentially create conflicts with elk management, depending on their intensity.

Saratoga Valley HMP Area (Proposed). The Saratoga Valley proposed HMP Area provides calving areas and summer, yearlong, and crucial winter range for approximately 4,230 elk. Maintenance of adequate forage and cover for winter elk is a primary wildlife objective.

Livestock grazing and mining for locatable minerals can potentially create conflicts with elk management, depending on the intensity of these activities.

Laramie Peak HMP Area (Proposed). The Laramie Peak proposed HMP Area provides summer, winter/yearlong, and crucial winter range for approximately 1,700 elk. Maintenance of adequate forage and cover for wintering elk is a primary wildlife objective.

Livestock grazing can potentially create conflicts with elk management, depending on its intensity.

Jelm Mountain HMP Area (Proposed). The Jelm Mountain proposed HMP Area provides primarily crucial winter range for approximately 1,615 elk. Much of this crucial winter range is on state land and in the Medicine Bow National Forest. Maintenance of adequate elk cover, as part of the forest ecosystem, is a primary wildlife objective. Currently, small tracts of merchantable timber stands are logged until a cover-forage ratio of approximately 40% to 60% has been reached.

Livestock grazing can potentially create conflicts with elk management, depending on its intensity.

Wick Elk Winter Area. The WGFD established the Wick Elk Winter Area in 1965. In conjunction with the WGFD's purchase of the Wick Brothers Ranch, a memorandum of understanding between the BLM and the WGFD was developed that reserves grazing use on 320 acres of BLM-administered public land for the use of elk and other wildlife.

Pennock Mountain Elk Winter Range. The WGFD established the 9,806-acre Pennock Mountain Elk Winter Range in 1962. The BLM agreed to reserve all grazing preference for wildlife on 6,284 acres of BLM-administered public land, including 1,530 AUMs of forage for wintering elk.

Bighorn Sheep

The habitat requirements for bighorn sheep seem to be keyed to good foraging sites near escape cover (rough terrain). Research has shown that bighorns prefer open grassy ridgetops, slopes, or benches within 100 meters of rocky outcrops, precipitous cliffs, or steep rocky slopes.

Habitat types most commonly used are rockland, upland meadows, sagebrush-mixed grass, big sagebrush-rabbitbrush, and mountain shrub. These habitats provide forbs and grasses, the major components in bighorns' diet from late fall to early summer. Sagebrush, rabbitbrush, and bitterbrush are the principal winter browse species that become especially important during periods of deep snow.

Bighorn sheep are found in four HMP areas: Ferris-Seminoe, Encampment Bighorn Sheep, Saratoga Valley, and Laramie Peak.

Bighorn sheep inhabited the Encampment River Canyon until their extirpation around the turn of the century. In 1976 and 1977, 68 bighorn sheep were reintroduced into the Encampment River Canyon. The population increased to approximately 135 by the fall of 1983. During the winter of 1983-84, the population sustained a 25% loss because of severe winter weather. The population decreased from 102 individuals in 1984 to 50 or 60 individuals in 1986. WGFD completion reports indicate that this reduction in sheep numbers may be attributed to competition with elk, mule deer, antelope, and cattle and from harassment by ORVs.

Because of the harassment (largely unintentional) of bighorn sheep by individuals snowmobiling on winter range, the animals are not using portions of the winter range that would otherwise be available to them. This harassment has led to overuse of certain areas and more competition among the sheep, elk, and deer, and therefore to excessive stress on animals already in a weakened condition. Improving habitat condition and utilization through reduced big game competition and ORV harassment is a primary wildlife objective.

In addition to current conflicts with livestock grazing, competitive big game, ORV use, locatable mineral exploration and mining, and wilderness designation could potentially create conflicts with bighorn sheep management, depending on the intensity of the activities.

Bighorn sheep were reintroduced to the Laramie Peak area in several small transplants from 1963 to 1973. The Laramie Peak bighorn sheep herd occupies historical bighorn sheep habitat and exists in small localized concentrations scattered throughout the area. The largest portion of the herd is found in the Laramie Peak Game Winter Range and the Laramie River. Other small subpopulations are found near Sellers Mountain and the North Laramie River; La Bonte Canyon and Upper Horseshoe Creek; Laramie Peak, Albany Peak, and Lower Horseshoe Creek; Marshall; and the Lower North Laramie River-Sheep Mountain.

Good quality habitat exists generally throughout the range, but the amount is limited, and indications are that the population level (325 bighorn sheep) has reached some sort of equilibrium with available habitat. A primary wildlife objective is to increase available high quality habitat through vegetation manipulation in order to need WGFD strategic plan objectives.

Livestock grazing can potentially create conflicts with bighorn sheep management, depending on its intensity.

The Ferris-Seminoe bighorn sheep population is basically made up of two herds, although some interchange may occur. As of 1980, it was estimated that approximately 200 bighorn sheep inhabited the area, primarily the Seminoe Mountains. Their numbers were believed to be stable to slightly increasing. In 1985, 100 more sheep were transplanted from Whiskey Mountain to the Ferris Mountains. Following the transplant, the sheep scattered-some moved west and south, with possibly as many as 70 remaining in the Ferris Mountains. Additional data are not available. The current estimate for the Ferris-Seminoe population is 175 sheep.

Livestock grazing and wilderness designation of the Ferris Mountains could potentially create conflicts with bighorn sheep management.

Bighorn sheep were reintroduced into the Douglas Creek area (Saratoga Valley HMP Area) in 1971. The population built up to 250 until the winter of 1979, when numbers were reduced significantly. Since then, the population has increased and stabilized at just under 200. The WGFD is currently studying this population to determine the cause of the decline and what factors, if any, are suppressing population numbers. Primary objectives will not be formulated until conclusive results are available from the study.

Livestock grazing, competition with other big game species, and conversion to agricultural uses can potentially create conflicts with bighorn sheep management.

Deer

Mule deer are distributed throughout the seasonal ranges in the planning area. In general, mule deer prefer habitat types that are in the early stages of plant succession and contain a large quantity of shrubs. Mule deer use the woody riparian, shrublands, juniper woodland, and aspen woodland habitat types extensively during spring, summer, and fall. These types provide adequate forage areas with security cover, as well as cover for fawning and succulent vegetation for lactating females.

With the onset of winter, deer are more restricted in their habitat selection. Deep snow makes many summer habitat types unavailable, concentrating deer at lower elevations. Wintering mule deer are often found in the juniper and limber pine woodland, big sagebrush-rabbitbrush, bitterbrush-sagebrush steppe, and riparian habitat types.

White-tailed deer utilize the willow-waterbirch and cottonwood habitat types along the major creeks and rivers. Population levels are low and data are scarce for these isolated herds.

Primary management objectives for deer are maintenance or improvement of forage and cover on crucial winter ranges and protection and improvement of high priority standard habitat types (including riparian). Potential conflicts with deer management could come from livestock grazing, competition with other big game, ORV use, wilderness designation, or exploration and development of coal, oil and gas, and locatable minerals. Mule deer in the Baggs HMP area are potentially the most vulnerable when cumulative impacts are considered.

Pronghorn Antelope

Pronghorn antelope are the most abundant and visible big game species in the planning area. Antelope inhabit open rangelands with a wide variety of habitat types rather than a monotypic vegetative community. These types have a high density of grass, forbs, and shrubs that produce an abundance of succulent vegetation.

Upland Game Birds

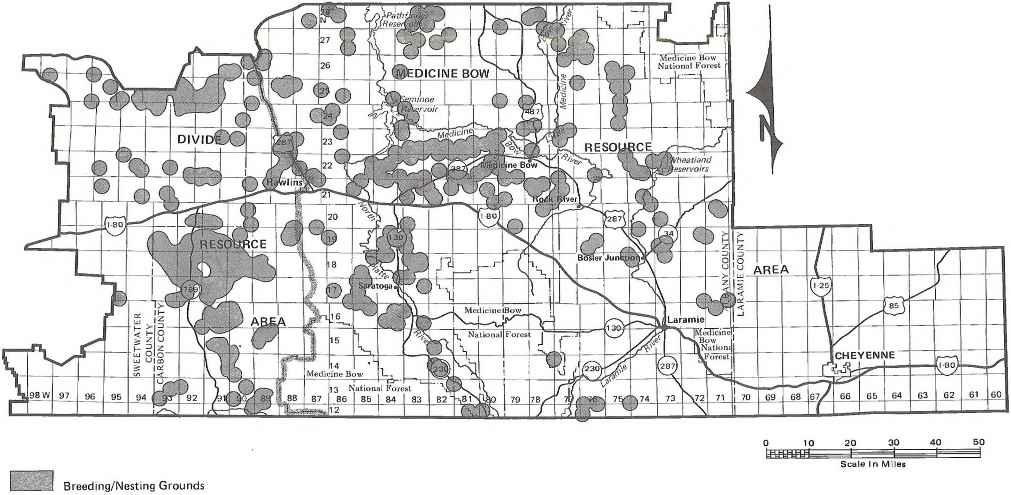
Sage Grouse

Sage grouse are the most common and widespread game bird in the planning area. A total of 280 sage grouse strutting grounds (both active and historical) have been documented during spring surveys. A list of the location and status of these strutting grounds is available in the office of the Medicine Bow and Divide resource areas.

During the spring, sage grouse concentrate on traditional strutting grounds for courtship and breeding. These grounds are usually in openings within a sagebrush stand where the adjacent sagebrush canopy averages 32% (Wallestad and Schladweiler 1974). Sage grouse breeding and nesting grounds are shown on map 56.

Sage grouse usually nest under sagebrush on drier sites in preference to the dense, tall sagebrush found on moist areas. The majority of the nests are located within 2 miles of the strutting ground, with occasional nests found 5 to 6 miles away (Wallestad and Pyrah 1974). Sage grouse avoid large stands of dense sagebrush (Klebenow 1972; Wallestad 1971).

Sage grouse tend to stay within 1.5 miles of water during the warm, dry summer periods. The critical spring, summer, and fall ranges should have water to support the hens and their broods.



Map 56

SAGE GROUSE BREEDING/NESTING GROUNDS

Medicine Bow-Divide Resource Management Plan

During normal precipitation years, water is generally available in most of the planning area, but water is a habitat-limiting factor in some areas.

To sustain current sage grouse population levels, three important habitat components-strutting/nesting grounds, brood-rearing areas, and wintering areas-should be maintained. Currently, a standard protection requirement prohibits surface disturbance on the strutting ground and within a 1/4-mile radius from the center of the ground. From the 1/4-mile distance to 2 miles from the center of the ground, nesting habitat is protected from surface disturbance during the nesting season.

The more important brood-rearing areas are usually found in meadow-riparian areas along intermittent and perennial streams. Protection requirements for these riparian areas benefit sage grouse.

Wintering areas for sage grouse are not well documented in the planning area. Typical wintering areas contain stands of tall sagebrush that stand above the snow and provide cover and food. Areas that blow free of snow are also used by sage grouse in the winter. These snow-free areas sometimes overlap big game crucial winter ranges. Seasonal protection requirements for the benefit of big game crucial winter ranges provide protection for some sage grouse wintering areas.

Loss of sagebrush habitat can be a major cause of sage grouse population declines. Most of the habitat alterations and losses that have occurred in the Divide Resource Area are attributed to agricultural practices such as sagebrush spraying and other sagebrush type conversion practices.

The activities and situations listed below have the potential to lead to the loss of sage grouse habitat in the planning area.

Livestock grazing-changes in vegetative composition, density, and structure; disturbance of nesting hens; nest trampling; removal of brood cover in meadows

Oil and gas activity-road and drill pad construction, combined with habitat modification during pipeline construction

Mineral exploration-surface disturbance

Failure and/or abandonment of key water projects in dry areas

Dewatering of lower sections of small streams because of irrigation diversions

Sharp-tailed Grouse

The Divide Resource Area is the only area in Wyoming where the Columbian subspecies of sharp-tailed grouse is known to occur. Current population estimates indicate that fewer than 400 birds occupy this area, according to a letter of September 15, 1986, from the WGFD to the BLM at Rawlins. During the spring, sharp-tailed grouse concentrate on traditional dancing grounds for courtship and breeding. These grounds are frequently located in a mixed shrub habitat (antelope bitterbrush, snowberry, big sagebrush) evenly mixed with grasses and forbs (Oedekoven 1985). Brooding habitat is characterized by a higher frequency of occurrence of snowberry.

Summer movements are thought to occur within a radius of 0.6 mile of the center of dancing activity. Fall activity takes place on ridges and knolls in mountain shrub habitat. During winter, sharp-tails generally utilize riparian areas and exposed mixed shrub communities at all elevations, where they feed on buds, berries, and catkins of trees and shrubs (Oedekoven 1985). Important habitat components, dancing/nesting grounds, brood-rearing areas, and wintering habitat are protected by the standard protection requirements identified for sage grouse. Conflicts with sharp-tailed grouse management generally are the same as those described for sage grouse.

Blue Grouse

Blue grouse are found in preferred habitats throughout the eastern three-fourths of the planning area. They do not inhabit the extreme western portion. Typical areas of occurrence are the Ferris and Seminoe Mountains, the Laramie Peaks area, and throughout the forest fringes associated with the Medicine Bow National Forest.

Preferred standard habitat types are the mountain shrubland, aspen-conifer woodland, quaking aspen woodland, ponderosa pine-Douglas-fir forest, limber pine woodland, and the lodgepole pine forest. The edges between these types and small riparian areas within these types are especially preferred. Breeding, nesting, and brood-rearing areas are typically found in the edge areas. Fire and timber harvesting, as well as other large-scale surface-disturbing operations such as mining, can damage or destroy blue grouse habitat. These activities also can have beneficial effects if proper vegetative structure and diversity are created or restored as a result of the activity.

Grazing pressure can force grouse out of areas where herbaceous forage utilization is excessively high. Grouse move to areas of steep slopes and heavy thickets less used by livestock.

Blue grouse habitat condition or trend is not adequately documented in the planning area, but conditions are known to vary from poor to excellent in different sites.

Raptors

Raptors (birds of prey) found in the planning area include eagles, falcons, hawks, harriers, and owls. Because they occupy an ecological position at the top of the food chain, raptors act as biological indicators of environmental quality.

Twenty-six species of raptors have been recorded in the planning area. Two species, the peregrine falcon and the bald eagle, are listed as endangered by the U.S. Fish and Wildlife Service. Twenty raptor species are known to nest in the planning area (Oakleaf et al. 1979).

The nesting-reproductive season is considered to be the most critical period in the raptor life cycle because it determines population productivity, short-term diversity, and long-term trends. Most species have specific nest site requirements such as nesting strata, available prey base, and freedom from nest site disturbance. These requirements are key factors in nest site selection and reproductive success.

Raptors often will concentrate their nests along cliffs or other formations and use these areas for nesting year after year. These high-use/high-density raptor nesting sites are called raptor concentration areas. Surface disturbance and human activity can upset a stable raptor population and the balance of the predator-prey relationships.

Although raptor nesting surveys have not been completely updated for the entire planning area, raptor concentration areas have been documented at Shamrock Hills, Brown Canyon Rim, Seminoe, Red Rim, Atlantic Rim, Cherokee, Muddy Creek, Doty Mountain, Delaney Rim, Bolton Rim, Hanna, and Platte-Divide (see map 57). These areas contain nesting concentrations of ferruginous hawks or of golden eagles and prairie falcons, depending on the type of nesting substrate.

Ferruginous hawks are a "category 2 candidate" on the USFWS list of candidate species for threatened or endangered status (see Glossary). Another category 2 species, Swainson's hawk, also nests in the planning area, but concentrations typical of other areas are as yet unknown in the planning area. Accipiters prefer aspen draws such as those found on Atlantic Rim.

By far the greatest impact on raptor production and population trends is human disturbance at the nest site during critical periods. Incubation is the most critical period. When disturbed, raptors are much more likely to desert their nest during incubation than after hatching. Once the eggs hatch, raptors exhibit a strong parental instinct and usually will not desert their young. The second critical period is fledging. If the nest is disturbed during fledging, the young could leave the nest before they are able to fly. Consequently, the fledglings fall to the ground, where they are easy prey for coyotes and other predators.

Waterfowl and Shorebirds

Many species of waterfowl and shorebirds occur in the planning area. Their abundance varies from year to year, depending on the availability of water.

Wetland-riparian habitat provides nesting and brood-rearing areas. The various sources of water in the planning area such as natural lakes, streams, and constructed reservoirs are important resting areas for a variety of ducks, geese, and shorebirds.

The BLM completed a survey of all standing waters on public land in Wyoming in 1977, using 1:24,000 topographic maps and color infrared aerial photographs taken between June 25, 1974, and September 30, 1976. Table 26 summarizes the acreages of reservoirs and lakes and the miles of perennial streams in the planning area. This provides an estimate of the potential waterfowl and shorebird habitat on public land in the planning area.

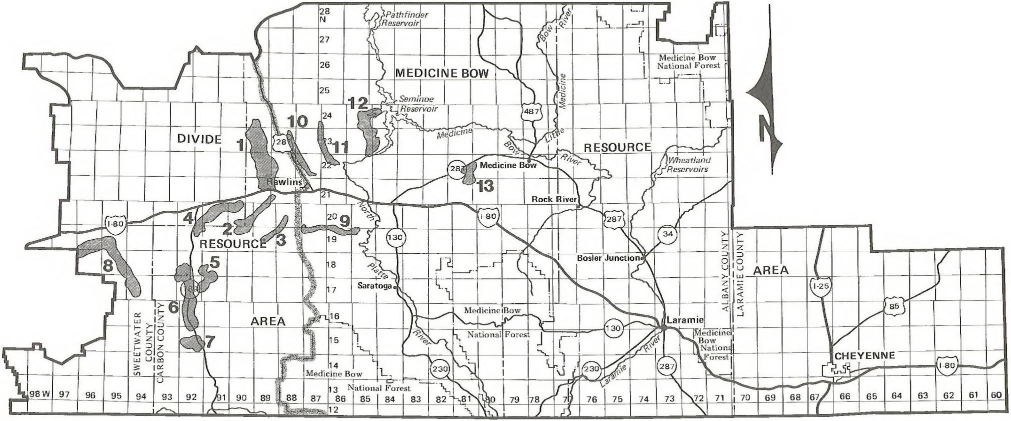
TABLE 26

ESTIMATED WATERFOWL AND SHOREBIRD HABITAT ON PUBLIC LAND IN THE PLANNING AREA

Reservoirs (acreage)[1]	Natural Lakes and Ponds (acreage)[1]	Perennial Streams (miles)
2,021 3,120[2]	1,411	340

[1] Estimated mean surface acreage. Fluctuations can be extreme.

[2] These acreages include five water bodies (lakes and reservoirs) in the checkerboard or in Albany County. These water bodies are on public land only when flooding expands them across property boundaries onto public land.



▨ Raptor Concentration Areas

1	Shamrock Hills
2	Red Rim
3	Atlantic Rim
4	Cherokee
5	Doty Mountain
6	Muddy Creek
7	Blue Gap
8	Delaney Rim
9	Bolten Rim
10	Brown Canyon Rim
11	Platte Divide
12	Seminoe
13	Hanna

0 10 20 30 40 50
Scale In Miles

Map 57
RAPTOR CONCENTRATION AREAS
Medicine Bow-Divide Resource Management Plan

Heavy grazing pressure is a problem in the majority of the riparian zones on public streams, small reservoirs, and ponds throughout the planning area. This results in trampling and removal of nesting cover for waterfowl and shorebird species that nest in riparian zones. Because of heavy grazing pressure, waterfowl reproduction is considered to be well below the potential in the planning area.

Projects to protect and improve habitat for waterfowl, shorebirds, and a variety of other species have been limited to a small number of riparian-wetland protective fences, some goose nesting platform installations, and pothole blasting and plantings. Livestock watering needs have been considered in all projects. Projects now functioning and being maintained are as follows:

Bucklin Reservoir goose nests
Shirley Basin Reservoir pothole blasting and protective fencing
Teton Reservoir protective fencing
Little Sage Creek Reservoir well and plantings
Flowing Well Reservoir pothole blasting

Other Migratory Bird Species of Note

Greater Sandhill Crane

In the last two decades the Rocky Mountain population of greater sandhill cranes has almost doubled; the current level is approximately 22,000. With the population increase has come an expansion in the breeding distribution of the species. There are three major production areas in the planning area, near Savery, Saratoga-Encampment, and Elk Mountain (Lockman et al. 1986). There is a secondary fall premigration staging area near Savery.

For nesting and brooding, this species requires a complex of shallow seasonally and permanently flooded wetland habitat, in association with riparian or other habitat that will provide concealment, escape, and thermal cover (Lockman et at. 1986). Additional data are needed on distribution, seasonal range densities, movements, and habitat use in the planning area. The WGFD is intensifying its efforts to acquire these data.

Long-billed Curlew

The long-billed curlew is a category 2 candidate species for threatened or endangered listing. Historically, long-billed curlews were abundant in suitable breeding habitat in Wyoming, including the planning area. Since the 1930s, this species has suffered a drastic decline throughout most of the state and can be considered abundant only near Merna, in west central Wyoming. Within the planning area, population numbers are undetermined, but they are believed to be low. Breeding is known to occur only near Pass Creek in the Saratoga Valley. Quantitative information on the cause of the decline is lacking (Cochrane and Oakleaf 1982).

White Pelicans

Until 1984, the only known nesting colony of white pelicans in Wyoming was at Yellowstone Lake. A second colony was located in 1984 on an island in Pathfinder Reservoir. The current breeding population of the colony is estimated at 1,248. In 1984, 245 nests were counted. The number increased to 384 in 1985, an increase of 57%, and to 624 in 1986 (62%). The island is used for nesting from April 1 to September 15 (WGFD 1985b; Findholt 1986).

The island where the pelicans nest is approximately 12 to 13 acres in size and has gradual slopes down to the water. It has a clumped shrub vegetative cover (silver sagebrush and rabbitbrush); the birds nest in the open areas between the shrubs. For the most part, the island is free of human disturbance; however, any human activity can disturb the birds. Other threats to the colony are predation during reservoir drawdown and erosion from wave action. The island also contains nesting colonies of California gulls and double-crested cormorants (Findholt 1986).

There are only 20 known nesting colonies of white pelicans in the United States, of which only 8 or 9 are in the West. The USFWS has identified the species as a migratory bird of high federal interest, and some authorities have recommended that it be classified as threatened (WGFD 1985b). The general historic population decline in white pelicans has been in response to habitat loss, including loss of nesting sites and feeding areas, human disturbance of nesting colonies, and pesticide contamination (WGFD 1985b).

The WGFD is conducting studies in an effort to determine food habits, to identify important loafing areas and foraging sites, and to locate migration and wintering areas.

Threatened or Endangered Species

Five endangered animal species are or may be present in the planning area: bald eagle, peregrine falcon, black-footed ferret, Wyoming toad, and least tern (USDI, FWS 1986). The piping plover, recently listed as endangered in the Great Lakes region and threatened throughout the remainder of its range, also may be present in the planning area. The following sections briefly summarize the ecological requirements of these species, which will be discussed in detail in a biological assessment that BLM personnel will prepare in 1986-87 for the USFWS, as required by the Endangered Species Act.

Black-Footed Ferret

No black-footed ferrets are known to exist in the planning area. When reports of sightings are received, they are investigated by the BLM or the WGFD. Most ferret activity takes place at night or during twilight; therefore, it is difficult to verify their presence.

A population of ferrets was discovered in 1981 near Meeteetse, in northwestern Wyoming. The WGFD is investigating the potential for the reintroduction of ferrets into Shirley Basin and south of Medicine Bow. Black-footed ferrets have been found to be closely associated with prairie dog towns; all prairie dog towns are potential black-footed ferret habitat.

Peregrine Falcon

In the planning area, the peregrine falcon is a rare migrant. While records of historical nesting in the planning area exist, no recent nesting activity has been documented. Recent sightings have occurred in the vicinities of the Ferris Mountains and Encampment River Canyon. Within the planning area, the Ferris Mountains are believed to contain potential nesting habitat.

Peregrines typically nest on tall cliffs that provide sanctuary from human disturbance. The most frequently used nesting cliffs are more than 100 feet high, and the majority are within 1 mile of a stream or river (USDI, BLM 1978b). The principal food items are passerine birds, waterfowl, and shorebirds.

Bald Eagle

Bald eagles use the planning area primarily in the winter, although some nesting has been documented along the North Platte River. A major wintering area is the southern part of the planning area, along the Little Snake River. More than 50 wintering bald eagles have been documented in this area. Other important wintering areas are the North Platte River and associated drainages between Fort Steele and Saratoga, the Sand Hills area, and the Muddy Creek-Dad Basin.

An important component of bald eagle winter habitat is perch sites, which serve as vantage points for hunting, vigilance against predators, loafing, and sunning. Cottonwood trees along the rivers are used as perch sites. In some cases perch sites double as night roosts. Food sources include fish, waterfowl, and carrion. In many areas, such as the Little Snake River, fish and waterfowl are not available because the river freezes over. In such areas, winter-killed deer on crucial winter ranges are the primary food source.

Wyoming Toad

The Wyoming toad is extremely rare and in fact may be extinct. The last known sightings occurred in the Laramie Basin in 1981, when field surveys located only two immature individuals, a male and female. The Wyoming toad is not known to occur on public land.

Least Tern

The least tern, listed as endangered in 1985, is documented from the 1930s as a summer resident along the North Platte River in Goshen County (outside the planning area). Extensive systems of dams and other water development projects have resulted in elimination or adverse alteration of island nesting habitat. No recent records of this species are known to exist in the planning area. While it is unlikely that this species inhabits the planning area, the possibility does exist; therefore, the species will be given full consideration in the biological assessment that will be prepared for the USFWS.

Piping Plover

Historically, the piping plover has been observed on the North Platte River north of the planning area. This species has suffered the same adverse impacts on island nesting habitat as the least tern. Recent records for this species in the planning area are not known to exist, and the planning area is not currently considered to be within its breeding range. Although unlikely, it is possible that a few individuals may occasionally visit the North Platte River during summers.

Furbearers, Predators, and Trophy Game

Several wildlife species are categorized as furbearers, predators, or trophy game. Some, like beaver, are economically important to Wyoming; others, like mountain lions and black bears, are hunted as trophies.

Beaver

Beaver are found in most perennial streams throughout the planning area. They usually are common in streams where willows and/or aspen are plentiful.

Beaver habitat areas are plentiful and are scattered throughout the planning area, except in the westernmost portion. Important areas include the forest fringes and willow riparian areas associated with the various shrub-steppe and grassland habitat types. Historically, excessive use of riparian areas has limited suitable beaver habitat in many areas.

Black Bear

Wyoming has both spring and fall hunting seasons for bears. The planning area contains all or portions of seven bear hunting units. Black bears were harvested in 1984 in only two of these areas, both of which contain portions of the Medicine Bow National Forest. While no data are available, it is assumed that a portion of the 24 bears harvested may have been in the forest fringes, on public land.

Mountain Lion

Mountain lion habitat is essentially that of the lions' prey-mule deer. In Wyoming, mountain lions prefer conifer woodlands and juniper, mountain shrub, and rockland habitat types. Recent sightings have occurred in the Medicine Bow National Forest fringes, Muddy Gap, Whiskey Gap, and the Bennett Mountains.

Fisheries

Habitat and Species

The planning area contains 105 trout streams and rivers that cross BLM-administered lands for part of their lengths, and there is a total of 160 miles of trout stream on public land in the planning area. The BLM has land management responsibility for part or all of the shorelines of three small natural lakes and twelve reservoirs that currently support gamefish in the area.

The waters of the planning area have not been subdivided into various standard habitat types. Taken as a whole, these waters are the least plentiful of all habitats. The presence of open water is partly responsible for the high diversity of wildlife species in adjacent riparian habitats, and many fish and wildlife species are totally dependent on open water (for example, trout, waterfowl, aquatic furbearers). Aquatic habitats, which are very important to fish and wildlife, are sensitive to human disturbance.

Management alternatives considered in this document could alter both physical habitat and recreational value of some of these waters. Only the waters that could be physically changed as a result of one of the alternatives will be described in this section. Fishing waters for which only recreational value could be changed (for example, by increase or decrease in access) are discussed in the "Recreation" section.

Game fish present in waters on BLM-administered lands are the brown trout, rainbow trout, brook trout, Colorado River cutthroat trout, mountain whitefish, and walleye.

There are no fish species listed as threatened, endangered, or sensitive in the planning area. The Colorado River cutthroat trout is classified as category 2 by the USFWS, meaning that upon further study this subspecies could be designated as threatened. While there is no official list of sensitive species for the state of Wyoming or for BLM-administered public land in the state, three nongame fish species of concern to the WGFD are present on BLM-administered lands: the bonytail, the flannelmouth sucker, and the bluehead sucker. These species are described as being in a "sensitive situation." This means they were formerly more abundant in Wyoming, but that their distribution is now restricted and their presence in Wyoming may be in jeopardy.

Since management actions prescribed in this document would not affect habitat of the Colorado River cutthroat trout, whitefish, walleye, or sensitive nongame species, those habitats will not be discussed in detail.

Affected Waters

BLM land management has little effect on the capability of the BLM-administered lakes, reservoirs, and larger rivers in the planning area to produce fish. Rather, gamefish production is limited by such factors as a harsh and variable climate or watershed conditions over large acreages of mixed landownership upstream. Therefore, lakes, reservoirs, and large rivers will not be discussed further in this section.

Small stream habitat is the type of water that would be most likely to be affected by management alternatives considered in this document. The typical BLM-administered stream is found in a foothills setting, is generally less than 15 feet wide, and contains brook trout. Habitat conditions range from excellent to poor. Habitat trend has not been quantified on BLM-managed streams in the planning area. However, the habitat quality of small trout streams in the planning area is highly dependent on the presence of woody riparian vegetation along stream banks.

There is strong evidence (through such methods as comparison of old and new aerial photography and stream surveys) that substantial amounts of woody riparian vegetation have been lost in portions of the planning area over the past 50 years. This indicates that a general downward trend in trout stream habitat is probably occurring in the planning area because of loss of beaver ponds, debris jams, and subsequent channel erosion. The presence or absence of beaver ponds is perhaps the major factor determining habitat and recreational quality of small streams in the planning area; the more ponds, the better. Beaver pond fishing is popular, and the pools formed increase trout size, production, and survival.

Many small streams provide little or no recreational fishing for a variety of reasons, including lack of beaver ponds, lack of easy physical or legal access, extremely short lengths of some reaches of BLM-administered public streams, or availability of better-known or more accessible water nearby. However, their condition is important for the condition of aquatic habitat downstream, for summer water supply and water quality downstream, and for support of many wildlife species.

Management Opportunities

The land use that has affected small streams in the planning area to the greatest extent and degree of severity is livestock grazing. Small trout streams have been adversely affected to varying degrees, depending on intensity, timing, and kind of livestock use (see the section on typical impacts of livestock grazing on fisheries in the Wildlife appendix). Damage ranges from very light to heavy (in localized areas).

The grazing EIS area contains about 52 miles of trout stream crossing BLM-managed public lands. Of this length, about 33.5 miles (66%) are found in "I" category allotments. Implementation of AMPs could serve to improve small stream habitat. In addition, habitat management plans would be developed to improve such habitat. HMPs proposed in this document would encompass about 34.5 miles of small trout stream. Table 27 shows the approximate length of streams on public lands and indicates which are in proposed HMP areas, in "I" category allotments, or both.

The average length of a segment of BLM-administered stream in the planning area is less than a mile, and it is common to find several small sections of BLM-managed public stream interspersed with state and private lands on a given stream. This situation reduces the manageability of many miles of public stream in the planning area. Improvements could be made through consolidation of areas of important stream and associated riparian area through land exchange with the state of Wyoming or private landowners when mutually agreeable opportunities arise. Opportunities for improved fisheries management through land exchange are scattered throughout the planning area.

TABLE 27

AFFECTED STREAMS CONTAINING GAME FISH

Stream Names[1]	BLM Miles	Proposed HMP Area	"I" Category Allotment
North Platte River (Carbon County)			
Jack Creek	0.8	Yes	No
McLain Creek	0.3	Yes	No
Little Jack Creek	0.2	Yes	No
North Spring Creek	0.3	Yes	No
South Spring Creek	1.0	Yes	Yes
Centennial Creek	2.0	Yes	Yes
East Fork South Spring Creek	1.6	Yes	Yes
Heather Creek	1.0	Yes	Yes
North Heather Creek	1.3	Yes	Yes
South Heather Creek	1.5	Yes	Yes
Shingle Creek	0.7	Yes	Yes

TABLE 27 (Continued)

AFFECTED STREAMS CONTAINING GAME FISH

Stream Names[1]	BLM Miles	Proposed HMP Area	"I" Category Allotment
Cow Creek	0.2	Yes	No
Teddy Creek	0.7	Yes	Yes
Encampment River			
North Fork Encampment River	1.4	Yes	No
Miner Creek	2.7	Yes	Yes
North Fork Miner Creek	0.7	Yes	Yes
Copper Creek	1.0	Yes	No
South Fork Miner Creek	0.6	Yes	Yes
Hell Creek	0.2	Yes	Yes
Beaver Creek	0.7	Yes	No
Big Creek	3.0	Yes	Yes
Prospect Creek	1.4	Yes	Yes
French Creek	0.3	Yes	No
Corral Creek	0.3	Yes	Yes
North Cottonwood Creek	0.5	Yes	Yes
Cedar Creek			
North Cedar Creek	1.0	Yes	Yes
Austin Creek (tributary Seminoe Reservoir)	1.9	No	Yes
Campbell Creek	0.3	No	Yes
Headquarters Park Creek	0.1	No	Yes
Unnamed Tributary A	0.2	No	Yes
Unnamed Tributary B	1.5	No	Yes
Saylor Creek (tributary) Seminoe Reservoir)	1.8	No	Yes
Norbacher Canyon Creek	0.4	No	Yes
Corral Creek	0.5	No	Yes
Johnson Canyon Creek	0.3	No	Yes
Lost Creek	3.7	No	Yes
No. 2 Gulch	1.0	No	Yes
Sage Creek	2.6	No	Yes
South Fork Sage Creek	3.6	No	Yes
Medicine Bow River (Carbon County)			
Halleck Creek	1.4	Yes	No
East Fork Medicine Bow River	0.3	Yes	No
Slide Creek	0.5	Yes	No
Little Medicine Bow River	1.5	No	Yes
South Fork Little Medicine Bow River			
North Prong South Fork Little Medicine Bow River	0.5	No	Yes
South Prong South Fork Little Medicine Bow River			
Parsons Creek			
Unamed Tributary	0.7	No	Yes
Threemile Creek			
Unnamed Tributary	0.4	No	Yes
Muddy Creek			
Quealy Creek			
North Fork Quealy Creek	0.5	No	Yes

TABLE 27 (Continued)

AFFECTED STREAMS CONTAINING GAME FISH

Stream Names[1]	BLM Miles	Proposed HMP Area	"I" Category Allotment
Laramie River (Albany County)			
Jelm Creek			
Bear Creek	0.5	No	Yes
Shellrock Creek	0.4	No	Yes
Boswell Creek	0.3	No	Yes
Johnson Creek	0.3	No	Yes

[1] Indentation indicates tributary status.

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Chapter Four

Environmental Consequences

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter presents the environmental consequences of management actions described in chapter 2. Both beneficial and adverse effects are described.

Assumptions used in analyzing the environmental consequences are described in the next section. They include assumptions about the demand for various resources, the ability of the resources to meet the demand, the manner in which actions would be implemented, and the effects associated with certain types of actions. All assumptions are based on previous events, experience of personnel, and knowledge of the resources in the planning area.

Some of the management actions described in chapter 2 are common to all alternatives. To avoid repetition, the environmental consequences of the management actions common to all alternatives are presented in the next section. That section is followed by a section for each alternative, in which the theme of the alternative is stated, the anticipated developments are outlined, and the effects on each resource from each management action are discussed.

The effects that would result from management actions common to all alternatives are included in the conclusion statement for each environmental component, as are effects considered to be relatively minor.

Environmental consequences in WSAs in the planning area are covered in different documents. Alternatives and consequences for the Adobe Town WSA and the Ferris Mountains WSA are discussed in the Adobe Town-Ferris wilderness EIS (USDI, BLM 1984b). Three WSAs in the Medicine Bow Resource Area, Bennett Mountains, Prospect Mountain, and Encampment River Canyon will be covered in the wilderness supplement to this document (USDI, BLM forthcoming).

For the purpose of analysis, "short-term" impacts described in this document are those that would last five years or fewer; "long-term" impacts would last six years or more. Irreversible or irretrievable commitments of resources and unavoidable adverse effects are discussed in the text if they would occur. Similarly, effects on a given environmental component caused by a particular management action are discussed if they would occur. Otherwise, such effects are considered to be virtually nonexistent and are not discussed.

The analyses presented in this chapter were based on available information and on the professional judgment of resource specialists.

ASSUMPTIONS

Overall Assumptions

The following assumptions apply to all analyses presented in this chapter.

The BLM will comply with applicable laws, regulations, and policies in implementation of a resource management plan.

The management actions will be implemented as stated, and funding and personnel will be adequate to carry out the actions.

Standard operating procedures will be followed in plan implementation. Some of the standard operating procedures are summarized in the appendixes to this document.

Compliance with applicable laws, regulations, and policies is a part of day-to-day business. Such regulations deal with air quality, cultural resources, natural history resources, threatened and endangered species, and water quality. The effects discussed in the analysis are those that would result from management decisions, not those that would result from compliance with laws, regulations, and policies.

Assumptions for Cultural Resources/Natural History

Management actions involving surface disturbance are commonly carried out for forestry; lands; livestock grazing; leasable, locatable, and salable minerals; recreation; soils, water, and air; and wildlife. Cultural resources and paleontological resources would be enhanced by these actions because in most cases inventories would be completed before any surface disturbance could begin. Inventories would result in the identification and evaluation of previously undiscovered cultural resources and paleontological resources, which the BLM would then manage accordingly.

Management actions involving surface disturbance also have the potential to impair management of cultural resources and paleontological resources. Unmitigated disturbance of significant cultural resources and natural history resources could occur if the procedures described in the Cultural Resources/Natural History appendix did not provide for the completion of on-site inventories before surface-disturbing activities began, or if completed inventories failed to identify all significant resources such as buried archeological sites or paleontological deposits.

The likelihood that significant cultural resources and natural history resources would be adversely affected is directly correlated with the amount of surface disturbance that would result from the management actions proposed under each alternative. Unmitigated surface-disturbing activities could dislocate or damage artifacts, features, or fossils. Destruction of these resources would result in a loss of scientific information and preclude interpretation of the resource values to the public. Adverse effects on natural history values in existing and proposed NNLs also could result from unmitigated surface-disturbing activities if the resources for which the area is or may be designated were altered or defaced.

Management actions for the following programs or resources will have virtually no effect on cultural resources/natural history management: recreation; soils, water, and air; rare plants; visual resources; wild horses; or wildlife habitat and fisheries.

Assumptions for Fire Management

Except where specifically discussed, the environmental effects of the proposed fire management actions are not expected to be great. This is because the chance of a large wildfire that could seriously damage sensitive resource values is not considered to be great, even in areas proposed for limited fire suppression. The primary benefit that would be derived from fire suppression designations is increased efficiency of fire suppression activities.

However, large, damaging fires can occur. The potential effects on sensitive resource values from such an occurrence will be considered when fire management plans are developed after completion of this RMP. Some of the values to be considered are significant cultural resources, crucial big game winter range, high priority watersheds, fragile soils, oil and gas fields, air quality, and high value scenic areas.

Proper application of prescribed fire can improve wildlife habitat, make livestock forage more available, and reduce (in a cost-effective and environmentally acceptable manner) the fire hazards presented by an accumulation of fuels.

Assumptions for Forestry

The long-term sustained yield capacity of the forests in the planning area is 26 MMBF per decade.

The demand for major wood products (sawtimber sales) will continue at a level higher than the long-term sustained yield capacity.

The demand for minor wood products such as firewood, posts, poles, Christmas trees, and wildlings will remain constant. Public demand for these minor wood products will be met. Minor wood products sold will average 350 cords of firewood per year and 200 trees cut for posts, poles, Christmas trees, and wildlings per year.

All timber that is scheduled for harvest will be sold and removed.

Approximately 80% to 90% of the timber removed will be harvested by the clearcut method.

The average clearcut size will be 10 acres.

The average volume per acre in a clearcut will be 10 thousand board feet (MBF).

Approximately 1 mile of temporary road will be constructed for every 1 MMBF harvested.

No new permanent roads will be needed for timber harvest in the next ten years. The need for new permanent roads beyond the next decade cannot be predicted at this time.

The selling value of lumber will be $369 per thousand board feet.

The stumpage value of timber will be $20 per MBF.

The employment generated by harvesting 1 MMBF will be 9.87 work-years.

The revenue generated by harvesting 1 MMBF will be $737,000.

Clearcuts will be adequately restocked within five to seven years after harvest.

Temporary roads will be revegetated within three to five years after closure.

Minor wood product sales will have no appreciable effect on the 85,228 acres of woodlands in the planning area because the demand is small in relation to the large acreage.

Except for aspen, most of the woodland will maintain its present state. The demand for aspen wood products is insufficient to keep the aspen from decadence—conifer invasion, disease, and stagnation will proceed.

Public forestlands in contiguous, relatively large blocks are more efficiently managed for forest products than are public forestlands that are scattered among lands under other ownership. This is because less time is required to determine ownership boundaries and to acquire access in relatively large blocks of public forestland. In addition, more public timber is available from any given access route in the large blocks. Therefore, consolidation of public lands in forested areas would enhance the BLM's forest management efforts.

Management actions for the following programs or resources will have virtually no effect on the forest resource under any of the alternatives: cultural resources/natural history; fire management; lands; livestock grazing; minerals; recreation; soils, water, and air; rare plants; visual resources; wild horses; or wildlife habitat and fisheries.

Assumptions for Lands Program

The demand for disposal of public lands will average about 500 acres per year. That figure represents disposals for which no land would be acquired in return. Thus, if demand is fully met, the public land base in the planning area will be reduced by 10,000 acres in 20 years. This is approximately ¼ of 1% of the land base in the planning area.

Before any disposals, lands will be examined for the presence of high-value resources. Lands containing high surface values will not be disposed of, or the disposal will provide for those values to be preserved. Therefore, land disposals will not substantially affect resource programs.

Construction and improvement of roads and highways will disturb 589 acres per year. Approximately 90% of these roads will be included in the estimated acreage of disturbance per oil/gas well (see the assumptions for minerals). Therefore, over a 20-year period the disturbance will amount to 1,178 acres.

An average of 17 acres per year will be disturbed by the installation of telephone and fiber-optic cable. This will amount to 340 acres over a 20-year period. Because the "split trench" method of construction will be used, disturbed areas will be partially revegetated one year after construction.

Power lines will disturb 1 acre per year, or 20 acres over a 20-year period.

Pipeline construction will disturb an average of 644 acres per year. Approximately 85% of this disturbance will be from oil/gas distribution lines, which are included in the estimated 40 acres of disturbance per well (see the assumptions for minerals). Therefore, disturbance from transmission pipelines and water lines over 20 years will amount to 1,932 acres. Four years after construction, vegetation will be partially restored through reclamation.

An average of 11 acres per year will be disturbed by the construction of ditches. This will amount to 220 acres in 20 years.

Communication site construction will disturb an average of 9 acres per year, or 180 acres over 20 years.

Other facilities will disturb 58 acres per year, or 1,160 acres over 20 years.

A total of 5,030 acres will be disturbed by transportation and utility systems over 20 years. About 45% of the disturbed acreage will be revegetated through reclamation within that time.

Management decisions for any of the alternatives will have no effect on the amount of projected development of utility and transportation systems; however, the locations and costs of facility development could be affected.

The effects of utility and transportation development will be mitigated individually. Generally, this will be accomplished by consolidation of new developments into existing routes or by innovative construction techniques that disturb less land and improve reclamation success.

Disposal of small, isolated parcels of public land would decrease the cost of public land administration in the planning area and enhance efficiency in management of the remaining public lands. In addition, it would decrease conflicts between public land users and private landowners.

Competitive sales of small, isolated parcels might lead to pricing beyond the capability of the owners of property adjacent to those parcels. If owners of adjacent or surrounding property could not purchase the isolated parcels, land use conflicts might develop.

The lands program is a service program rather than an environmental component. The discussion of the effects on lands in each alternative will be limited to the effects on community expansion opportunities and the effects on utility and transportation systems.

Management actions for the following programs will have no effect on the lands program under any of the alternatives: fire management; forestry; livestock grazing; minerals; recreation; or wild horses.

Assumptions for Livestock Grazing

The demand for livestock forage is cyclic and difficult to predict with certainty. Demand for forage generally follows the health of the livestock market. Present demand is low. Over the past five years actual use of livestock forage on the public lands in the planning area has averaged 147,024 AUMs. This figure is projected as an average demand level for the next 20 years. Actual levels of use during this period could vary from substantially lower than the present up to the established active preference level.

Implementation of many of the livestock grazing decisions will be deferred until monitoring is completed. Conditions will be monitored and management will be adjusted as necessary on the basis of new data from evaluation and monitoring procedures.

The monitoring requirement will cause some delays before specified on-the-ground actions can be implemented. In the meantime, current condition and trend will continue.

Baseline data for vegetation condition and trend, habitat condition, and other parameters are the best available for planning and analysis purposes. Data have been extrapolated when necessary to cover areas for which no data were available.

The principal environmental component that would be directly affected by livestock grazing is vegetation. Any change in vegetation would affect other resources.

The livestock grazing decisions for Divide Basin, Overland, and Seven Lakes planning units were previously analyzed in the Divide grazing EIS (USDI, BLM 1983a, 1983b) and the Seven Lakes grazing EIS (USDI, BLM 1978a; n.d.). These decisions and analyses will not be repeated in detail in this document. Management actions for lands and minerals could affect livestock grazing in the Divide and Seven Lakes areas; therefore, those effects will be summarized in the introduction under "Effects on Livestock Grazing" under each alternative. In addition, the cumulative effects of livestock grazing management for the entire planning area are summarized where appropriate. Copies of the rangeland program summaries (RPSs) for these areas (USDI, BLM 1984a, 1983d) can be obtained from the Rawlins District office.

The effects of wild horse management on livestock grazing also were analyzed in the grazing EISs for the Divide and Seven Lakes areas (USDI, BLM 1983a, 1983b, 1978a, n.d.). The effects on livestock grazing from wild horse management under existing activity plans are negligible. There are no wild horses in the Medicine Bow grazing EIS area.

Management actions for the following programs or resources will have virtually no effect on livestock grazing under any of the alternatives: cultural resources/natural history; fire management; recreation; soils, water, and air; rare plants; visual resources; wild horses; or fisheries.

Assumptions for Minerals

General Assumptions

Disposal of public lands could affect the cost of mineral development to some extent by creating "split estate." The magnitude of this situation is expected to be minimal because lands with known mineral value normally would not be disposed of. However, it is possible that lands containing unknown mineral values could be disposed of where our current knowledge of existing minerals is inadequate. The minerals, if reserved by the United States, would be legally available for development. It would then be necessary for those wanting to develop the minerals to negotiate with the new surface owner as well as with the BLM. This could result in higher development costs.

Salable minerals are developed at the BLM's discretion. No development is projected for nonenergy leasable minerals, geothermal resources, or oil shale under any of the alternatives. Therefore, there would be no effect on the availability of salable minerals, nonenergy leasable minerals, geothermal resources, or oil shale, and hence no effects on other environmental components.

Under all alternatives, the potential exists for conflicts between oil and gas development and coal development. Where wells have been developed, or are proposed to be developed, in structures below the coal, the coal developers and the oil and gas developers will have to reach a mutual agreement based on the rights of each party.

Utility systems and other surface facilities placed over coal reserves could cause potential conflicts. The need to move or avoid such facilities can restrict the flexibility of mining methods, causing delays in development and increasing overall project costs.

Management actions discussed in chapter 2 could affect the availability of mineral resources but in most cases would not affect the resource itself. In certain instances, oil and gas resources could be affected if management actions restricting or prohibiting oil and gas development on public land caused the loss of the resource through drainage from surrounding lands.

Management actions for the following programs or resources will have virtually no effect on the availability of minerals under any of the alternatives: fire management; forestry; livestock grazing; leasable minerals other than coal or oil and gas; salable minerals; recreation; soils, water, and air; visual resources; or wild horses.

Leasable Minerals—Coal

The demand for coal resources is cyclic. Although present levels of demand are low, coal will remain essential to the national economy, and increased levels of production can be expected in the long term. Coal production may not have reached the low point in the cycle yet, and local demand will remain low because higher quality, lower cost coal is available from other fields. Coal from the Powder River region is of lower quality but is typically mined at substantially lower cost; consequently, Powder River coal will continue to dominate new utility markets (BXG, Inc. 1986).

On the basis of historical data and current and projected market information, it is estimated that the average coal production would be 3.2 million tons per year for the next 20 years. Production in 1985 was 3.3 million tons. Past experience in the planning area indicates that approximately 125 acres of disturbance occurs for every 2 million tons of coal production. Therefore, approximately 4,000 acres could be disturbed by coal activities in the next 20 years. Reclamation would be accomplished 12 years after the end of mine life (USDI, BLM 1983c).

Economic conditions are such that exploration for undiscovered coal resources is expected to be insignificant in the short term.

Any increase in coal production would take place first in the Hanna coalfields, then at Indian Springs, Wild Horse Draw, Red Rim, and Atlantic Rim.

Because of the present and projected low demand for coal, the projected production from existing and future leasing as estimated in this document would meet demand over the next 20 years under any of the alternatives. Some alternatives could limit choices of economically viable areas available for leasing and development.

Application of the coal unsuitability criteria results in eliminating coal from further consideration. This will not be addressed as an impact because application of the criteria is an action that follows prescribed steps established in regulation and policy. The entire coal screening process is described in the Coal appendix.

Coal decisions are summarized in the Coal appendix. An analysis of future leasing and the environmental effects of continued production on existing coal leases appears in the round two draft EIS for Green River-Hams Fork (USDI, BLM 1983c) and in the final EIS for the first round coal lease sale for Green River-Hams Fork (USDI, BLM 1980b). These decisions and analyses will not be repeated in this RMP/EIS. The effects of coal decisions will be included in the discussions of cumulative effects on environmental components as appropriate.

Leasable Minerals—Oil and Gas

Exploration and development of oil and gas has been cyclic. Although current demand for oil and gas is low, oil and gas will remain essential to the national economy, and exploration and development are expected to increase in the long term, subject to national and international economic influences.

The planning area has significant known oil and gas resources, and geologic relationships are favorable for the occurrence of additional, currently unevaluated or unrecognized oil and gas resources.

The current level of oil and gas activity is relatively low because of low demand, and it is likely to remain low in the short term. However, on the basis of analysis of past drilling trends, the average growth rate in new wells in the next 20 years is projected to be 0.725% per year. It is projected that approximately 1,440 new wells will be drilled on private, state and federal mineral estate in the planning area over the next 20 years.

Table 28 shows the success rates for oil wells in the planning area. Of the completed wells, 66.6% will be gas wells and 33.3% will be oil wells. Past experience in the planning area indicates that approximately 40 acres of surface disturbance occurs for each gas well brought into production (including well pads, pipelines, and roads). Dry and abandoned wells disturb 25 acres each. Ten acres is disturbed for each completed oil well. Reclamation on dry and abandoned holes is complete in three to five years. For wells that are brought into production, 50% of the pad and all the associated pipelines are reclaimed in three to five years.

TABLE 28

OIL AND GAS STATISTICS FOR THE PLANNING AREA

Production Area	Number of Wells Drilled	Percentage of Wells That Produced
Lost Soldier	598	83
Washakie	1,052	63
Albany/Laramie	839	36
All other areas	1,182	43
Total	**3,671**	

A total of 3,671 wells were drilled in the planning area from 1911 to 1985—1,763 on federal mineral estate, 221 on state-owned mineral estate, and 1,687 on private mineral estate. Of these wells, 943 were oil wells, 725 were gas wells, 1,896 were dry and abandoned, and 107 were water injection wells. The total disturbance resulting from drill pads, roads, and pipelines is estimated at 93,059 acres, of which 71,136 acres have been reclaimed. It is estimated that a total of approximately 34,355 acres will be disturbed on land under all ownerships in the planning area in the next 20 years. Of this, an estimated total of 18,263 acres will have been reclaimed at the end of the period.

Although geophysical exploration would continue to be active and widespread throughout most of the planning area, disturbance by geophysical exploration will be minor.

The availability of oil and gas would not be greatly affected by restrictions on surface disturbance involving steep slopes, riparian areas, important cultural and historical resources, developed recreation sites, and other localized surface resources. The areas affected often are small enough that a proposed well location usually can be moved a short distance without hindering the recovery of the oil and gas resource. Some of the stipulations may be waived or modified if the lessee develops an acceptable plan for mitigating anticipated impacts. Some areas affected by such restrictions have low or no potential for the occurrence of oil and gas.

Larger blocks of public land on which surface protection restrictions apply have more potential to reduce the availability of oil and gas resources. Restrictions on large areas would necessitate directional drilling, which is less efficient and more expensive than vertical drilling and has many limitations. These larger areas probably would not be explored because the expense would be greater. Some reservoirs could not be reached and developed, causing loss of revenues to the lessee and the United States. Geophysical operations that are necessary for exploration and discovery of subsurface oil and gas traps could be precluded.

Leasing of public lands with seasonal restrictions (that is, restrictions closing or limiting operations during certain months) would affect the availability of oil and gas. Generally, wells drilled 15,000 feet deep or deeper cannot be drilled in the four to seven months the lands would be open. The operator would have to request an extension of time from the BLM or cease operations until the restricted period had ended. Drilling of offset wells to expand a newly discovered or existing field would be delayed until the next open drilling season. Such options cause delays, increased costs, less efficient development of the resource, and short-term loss of revenues to the lessee and the government.

Locatable Minerals

The demand for locatable mineral resources is cyclic. Present levels of demand are low, and demand probably will continue at present or increased levels for the foreseeable future. The geologic data base for locatable mineral resources generally is not adequate for precise substantive predictions or quantification. The known geologic relationships in the planning area, coupled with past and present mineral activity, would indicate that locatable mineral activity will represent significant value to the local economy.

Of all locatable mineral development, uranium mining has caused the greatest impact on other resources in the planning area. Present levels of uranium development are low, but significant reserves remain to be mined. Production for the next 20 years probably will remain at the present level of 0.3 million tons per year. Activity probably will continue in Shirley Basin, and some activity is expected in Poison Basin and the Red Desert.

An average of 1 acre is disturbed for every 4,000 tons of uranium ore mined.

Assumptions for Recreation

The *1985 Wyoming State Comprehensive Outdoor Recreation Plan* (SCORP) (Wyo. Rec. Comm. 1985) contains an estimate that participation in both big game hunting and fishing will increase by 18% statewide between 1984 and 1990. There is no basis for an assumption that future demand for these activities in the planning area would be substantially different from the statewide average.

The SCORP also contains an estimate of an increase of 18% in participation in ORV use statewide. Again, there is no basis for assuming any difference between demand for this activity in the planning area and the statewide estimate.

Effects on recreation can be stated in terms of changes in the availability (quantity) and quality of recreation opportunities. The change in availability of recreation opportunities is measured as a change in visitor days where possible. The change in quality of recreation opportunities, which is more subjective, is measured in terms of improved or degraded quality.

Management actions for the following programs or resources will have virtually no effect on recreation opportunities under any of the alternatives: fire management; forestry; lands program; salable minerals; soils, water, and air; rare plants; wild horses; or wildlife habitat and fisheries.

Assumptions for Soils, Water, and Air

Air quality has the potential to be affected by mineral development, lands and realty actions, timber management practices, livestock grazing management activities, ORV uses, recreation activities, wildlife development, and fire control efforts under each alternative. However, the total effects under any of the alternatives would be expected to be within an acceptable range as defined by law.

Implementation of BLM activities and BLM-permitted activities is controlled through stipulations and monitoring so that they comply with applicable federal and state standards for air and water quality. Although violations through accidental occurrences or noncompliance with BLM stipulations are possible, the probability of their occurrence and magnitude is low enough that they are projected to be nonexistent.

Soil loss tolerance for soils in the planning area is estimated to be 2 tons per acre per year. Any loss that exceeds this amount will lower soil productivity.

Unless otherwise specified for particular situations, reclamation will reduce accelerated erosion to below the soil loss tolerance levels within five years after reclamation efforts begin.

Vegetation increases soil organic matter, aggregation of soil particles, and soil porosity, all of which increase soil resistance to erosion. The removal of vegetation increases the erosive force of overland water flow and reduces protection from surface crusting by raindrop impact.

Soil compaction increases water runoff and thereby promotes sheet, rill, and gully erosion on site and stream downcutting and gullying off site. The greatest compaction occurs when soils are moist or wet. Compacted soils are less accommodating to plant roots, and seed germination is difficult in such soils. This physically reduces soil productivity.

Disturbances like excavation alter the developed soil profile by destroying protective vegetation, root channels, and the structure of the soil horizons. This reduces infiltration and increases runoff. Disturbances also disrupt the biological and chemical processes that contribute to soil fertility. Such disturbances expose soil materials to both wind and water erosion.

Increases in water runoff increase peak flows in perennial and ephemeral drainages. Increased flows can upset stream equilibrium, causing streams to downcut and ephemeral tributaries and other drainages to gully.Water tables then drop, reducing moisture available for plant growth. When this happens, riparian areas become degraded.

Erosion reduces soil productivity. Topsoil, in which nutrients used by plants are most concentrated, is removed. Erosion also causes soil surface crusting and sealing, which prevents moisture infiltration and seed germination and usually compounds the soils' erosion susceptibility (Nat. Soil Erosion-Soil Productivity Rsch. Planning Comm. 1981) Research has shown that a given plant community may support 1.5 to 2 times the vegetative production of a similar community that has 25% more erosion (USDI, BLM 1986).

Soil productivity could be reduced by sedimentation in surface waters and by downwind and downslope soil contamination from eroded sands, clays, and salts.

Surface disturbance on unstable slopes can cause changes in moisture content and weight distribution, which could result in landslides, slumps, and mud flows.

Increased sedimentation would degrade water quality and affect the whole food chain of aquatic life, from plants to invertebrates to fish. For example, increased sedimentation decreases sunlight transmission, which results in decreased photosynthesis and production of plants and algae, which are important food sources for small fish and other aquatic life. Sedimentation also destroys fish spawning habitat, eggs, and fry, as well as invertebrates that form the foundation of the aquatic food pyramid. Water temperatures would be increased and dissolved oxygen concentrations reduced, both of which would cause direct mortalities of fish and other aquatic life.

Management actions for the following programs or resources will have virtually no effect on soil, water, and air resources under any of the alternatives: cultural resources/natural history; leasable minerals other than coal or oil and gas; salable minerals; rare plants; visual resources; or wild horses.

Assumptions for Vegetation

Rangeland Vegetation

Management actions for livestock grazing and wildlife habitat would affect vegetation resources. The parameters for measuring effects on rangeland vegetation are changes in condition and trend.

Effects from surface-disturbing activities such as mining, transportation, and utility development would involve actual removal of the vegetation from the surface as opposed to changing the condition of the vegetation. The vegetation on approximately 13,735 acres of public land in the planning area would be physically removed and not reclaimed over the next 20 years. Areas where vegetation has been removed would be reclaimed after disturbance in such a manner that most areas would be returned to their original condition in the long term. Surface-disturbing activities could affect off-site vegetation condition and trend by causing increased erosion rates and downstream flows that would affect the ability of the soils to support vegetation. These types of impacts are generally localized and would not be expected to be large.

The effects on vegetation condition and trend that would result from management actions for livestock grazing and wildlife are discussed in the specific analyses of alternatives in this chapter, as are effects of each alternative on riparian vegetation and rare plants.

The effects on vegetation condition and trend under existing activity plans for wild horse HMAs are negligible. There are no wild horses in the Medicine Bow grazing EIS area.

Management actions for the following programs or resources will have virtually no effect on rangeland vegetation condition and trend under any of the alternatives: cultural resources/natural history; fire management; forestry; lands program; minerals; recreation; soils, water, and air; visual resources; wild horses; or fisheries.

Rare Plants

It is not expected that either of the two candidate plants in the planning area will be designated threatened or endangered in the next ten years because there is a lack of available data to support designation.

Assumptions for Visual Resources

Management actions for the following programs or resources will have virtually no effect on visual resources under any of the alternatives: cultural resources/natural history; fire management; forestry; lands program; livestock grazing; locatable minerals; salable minerals; recreation; soils, water, and air; wild horses; or wildlife habitat and fisheries.

Assumptions for Wild Horses

Wild horse numbers in the planning area will remain at levels identified in the Divide and Seven Lakes grazing EISs (USDI, BLM 1983a, 1983b, 1978a, n.d.), and herds will remain within the herd areas identified in those documents. Population objectives for wild horse herds are presented in table 1 in chapter 2. The herd management areas are shown on map 44 in chapter 3.

Under existing activity plans for wild horse HMAs, conflicts with other resources have been minimal. No effects on wild horses are expected from management actions for other resources, nor are management actions for wild horses expected to affect other resources.

Assumptions for Wildlife and Fisheries

General Assumptions

No candidate wildlife species in the planning area are expected to be designated threatened or endangered within the next ten years because data are not available to support designation.

The quality and quantity of crucial winter ranges are generally considered to be the limiting factors on big game populations in the planning area. The ability of these crucial areas to support wintering populations is a major factor in determining yearlong population levels. As hunter demand increases in the future, the relative importance of big game crucial winter ranges in maintaining populations at objective levels will increase.

Management actions for cultural resources would have no measurable effects on wildlife except in the Como Bluff area, where restrictions to protect cultural values would have a secondary effect of preserving wildlife habitat values. Management actions for recreation other than ORV use would not have important effects on wildlife and fisheries resources anywhere in the planning area.

Major decisions for management of livestock and wild horse grazing already have been made for the Divide Resource Area and a portion of the Medicine Bow Resource Area through the Divide and Seven Lakes grazing EISs and RPSs (USDI, BLM 1983a, 1983b, 1984a, 1978a, n.d., 1983d). Therefore, effects on wildlife and fisheries from grazing in those locations will not be analyzed in detail in this document, except for the purpose of determining cumulative effects.

Fisheries

Analysis of impacts on fisheries from livestock grazing will be restricted to effects on trout stream habitat and on the development of new habitat in the form of reservoirs. The capability of existing lakes, ponds, rivers, and reservoirs on BLM-managed public land in the planning area to produce fish is generally not affected by grazing and grazing management. The watershed condition of large tracts of land of mixed ownership upstream, the effects of a highly variable and harsh climate, and other factors tend to limit the productivity of these types of waters.

Since trout stream habitat trends are not quantified, the following definitions are used:

> A positive effect is a reduction or reversal of the rate of habitat degradation, an increase in the rate of habitat improvement, or the creation of new habitat. The term *positive effect* does not necessarily mean that habitat quality or quantity would be increased in the future; it simply means there would be improvement over the existing situation.
>
> A neutral effect means there would be no change in rate of habitat degradation or improvement.
>
> A negative effect is an increase in the rate of habitat degradation or a decrease or reversal in the rate of habitat improvement.

In the analysis of the consequences of the alternatives, changes in three grazing management variables were considered. These variables were selected as those which, if changed, could affect fish habitat at a level of implementation described in the alternatives. They could be increased or decreased by the livestock grazing management alternatives discussed in this document.

Variable 1: Miles of Stream Improved

The first variable considered in analysis of effects on fisheries is the number of miles of trout streams under special grazing management to improve fisheries and associated riparian habitat.

Variable 1 is the most important. With special management (temporary or permanent fencing and implementation of special grazing systems), livestock-damaged stream habitat can be significantly improved. Without management specifically designed to protect and improve livestock-damaged aquatic habitat, little can be done to upgrade these areas. Conventional grazing systems, which are tailored to upland forage plant production, have rarely been demonstrated to be beneficial to riparian and aquatic habitat condition.

The effect of selecting one of the alternatives on the amount of habitat under special management in the EIS area probably would depend on changes in the number and objectives of AMPs. Results of intensive monitoring studies might also lead to inclusion of some damaged aquatic habitat under an HMP.

Variable 2: Conversions from Sheep to Cattle

The number of allotments converted from sheep to cattle is the second variable considered.

Adjustments in numbers of cattle and sheep could affect stream habitat. Minor to moderate adjustments in the numbers of cattle alone generally will not affect the level of aquatic habitat damage because cattle movements are uncontrolled and cattle tend to use the water's edge heavily at almost any population level.

Sheep movements usually are much more controlled than cattle movements, and sheep usually are directed away from the water's edge by herders. As a result, sheep tend to do less bank damage than cattle. Therefore, conversion to cattle can increase damage to aquatic habitat; conversion to sheep can reduce it.

The trend in recent years has been toward conversion from sheep to cattle in grazing allotments. This trend may well continue. Such conversions would have a negative effect on trout stream habitat unless the habitat is intensively managed.

Variable 3: Reservoirs That Will Support Trout

The third variable considered is the number of livestock watering reservoirs constructed or rebuilt to be of sufficient depth and size to support stocked trout.

Construction of larger, deeper livestock watering reservoirs that could support stocked trout could increase the amount of habitat in the future. Construction of reservoirs larger than necessary for livestock watering is not currently an accepted practice, but larger reservoirs would have the benefits of increased longevity and increased likelihood of providing water for livestock during severe drought in addition to providing substantial fishing recreation.

Wildlife

Analysis of the effects of forestry management actions on wildlife is based on information available through the forestry program. This information indicates that a major mountain pine beetle infestation now taking place in the planning area will decimate substantial amounts of wildlife habitat.

Analysis of the effects of coal development on wildlife is based on the analysis and mitigation of impacts arrived at through the coal unsuitability criteria review of each tract and the results of an elk study conducted in the Little Snake River known recoverable coal resource area (KRCRA) (Ward 1985). For a proper perspective, the reader should keep in mind that the surface disturbance projection for coal development over the next 20 years is 4,000 acres, or 200 acres per year.

In analysis of the effects of oil and gas development on wildlife, historical as well as projected habitat loss was analyzed. This analysis is included with the detailed description of typical impacts on wildlife from oil and gas in the Wildlife appendix.

In analysis of the effects of locatable mineral entry and development on wildlife, a "worst case" approach was used because of the sensitivity of mineral development to economic market conditions. While there is currently little activity and projections for the future are poor, changes in the world market could cause rapid unforeseen increases in development.

In the analysis of effects on wildlife under each alternative, reference is made to *spatial* and *temporal* management of disturbance. To clarify the analysis, these terms are defined as follows:

Spatial management, as used in this document, means intensive control of the location and level of surface disturbance that would be allowed in a particular area. Some examples of surface-disturbing activities that would fall under spatial management are structures, facilities, roads, and pipelines.

Temporal management, as used in this document, means intensive control of the period during which the BLM would allow activities that are physiologically disturbing or disrupting to normal wildlife activities (for example, elk migration). Such control of disrupting activities could be accomplished by restrictions on activities during certain times of day or during certain seasons.

Conditions that will be considered in efforts to accomplish effective spatial and/or temporal management are as follows:

Existing situation—type of disturbance, acreage of disturbance, juxtaposition of disturbances

Available alternative development sites

Available standard habitat sites in the use area that are important to the species of management concern

Current habitat condition

Population objectives and current population status

Elevation, slope, and aspect

Severity and length of winters (big game)

Susceptibility of species to a given disturbance

Availability of monitoring data

Nature and extent of proposed action

EFFECTS OF MANAGEMENT ACTIONS COMMON TO ALL ALTERNATIVES

Introduction

Some of the management actions described in chapter 2 are common to all alternatives. The effects of those actions are described here to avoid repetition in the analyses for the individual alternatives. If a resource or program is not discussed in the sections below, there would be no effects on that resource or program from the management actions common to all alternatives.

Effects on Cultural Resources/Natural History

The effects of surface disturbance on cultural resources/natural history are discussed in the "Assumptions" section of this chapter.

All alternatives include management actions of the cultural resources program to stabilize and protect significant sites and segments along the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail. Listing on the National Register of Historic Places would be sought for these sites. These actions would help to ensure the preservation and interpretation of the resources for present and future generations.

Management actions for cultural resources/natural history common to all alternatives would enhance the designated and proposed NNLs by ensuring that natural history values would be considered during the review of proposed surface-disturbing activities. This would minimize the disturbance of the values that characterize the areas.

Implementation of paleontological inventories in areas of surface disturbance (described in the Cultural Resources/Natural History appendix) would help to ensure preservation and interpretation of significant paleontological resources.

Effects on Recreation

Management Actions for Cultural Resources/Natural History

Under all alternatives, certain historic sites along the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail would be stabilized. Interpretation of these sites would benefit the recreating public by heightening awareness and appreciation of these historic trails. Interpretation of the trails would enhance historic area sightseeing. However, legal public access to these trails is limited; therefore, a significant increase in use is not anticipated.

Management Actions for Recreation

The ORV designations common to all alternatives would provide the maximum benefit to ORV users without either unnecessarily restricting users or unnecessarily damaging other resources. The Dune Ponds "open" area is easily accessible and allows for generally unregulated ORV play on a relatively small area near Rawlins, a major population center in the planning area. Existing conflicts with fishing activity would continue.

Management Actions for Visual Resource Management

Visual resource management actions for all alternatives would benefit recreation resources by maintaining the quality of the settings of recreation opportunities. Visitors would be able to enjoy recreation opportunities in a setting essentially unaltered from the present. VRM designations would directly benefit the Continental Divide National Scenic Trail SRMA because about 50 miles of the trail fall within VRM Class I and II areas. These classifications mean that visual intrusions would be limited and the high-quality visual setting would be maintained for trail users.

Effects on Soils, Water, and Air

Management Actions for Fire Management

Quick suppression of fires in full suppression areas would minimize the amount of soil exposed to wind and water erosion. If heavy equipment was used to construct fire lines, soil would be compacted and vegetation, including root material, would be removed. Fire lines could act as channels for surface water flow, causing gully erosion. Overall, the effect of reducing the acreage exposed to wind and water erosion would probably outweigh the effect of increased gully erosion along fire lines.

Impacts in areas of "full suppression with management options" would be similar to those in full suppression areas, but the use of heavy equipment to construct fire lines would be more controlled, so that the effect of increased gully erosion along fire lines would be less than under full suppression.

Limited suppression could result in the exposure of large amounts of soil to wind and water erosion if a fire burned a large acreage. However, the effect of increased wind and water erosion from limited fire suppression is not likely because most of the limited suppression areas have low vegetative production with little fuel to carry a large fire.

The overall effects on soils, water, and air from fire suppression zone designation would be expected to be minor.

Management Actions for Forestry

Forests would be managed to enhance other uses on 85,228 acres, or 77% of the forestlands in the planning area, in all alternatives. Harvest would be minimal in these areas and would be designed with protection of soil, water, and air resources as a primary goal. Impacts from surface disturbance related to forest management would be minimal.

Management Actions for Lands

Installation of utility systems and other facilities would cause short-term effects on soils, water, and air until the disturbed area had been reclaimed. The major effects would be increased wind and water erosion, potentially increased sedimentation during construction, and increased dust particulates in the air during construction.

Long-term effects would be associated with access routes to utility and transportation facilities. Travel on unpaved roads would add particulates to the air. This effect would be localized and would not violate ambient air quality standards. Increased erosion and sedimentation would occur from compaction, destruction of vegetative cover, and channelization of surface runoff in ruts and road ditches.

Management Actions for Minerals (Coal)

The acreage available for consideration for coal leasing varies among the alternatives (from 49,780 acres in Alternative A to 64,595 acres in Alternatives C and D). However, it is projected that about 4,000 acres would be disturbed over the next 20 years regardless of the amount available. Five areas encompassing 49,780 acres would be available under all alternatives.

Surface disturbance from surface coal mining has a higher potential to cause unacceptable rates of accelerated erosion on specific sites than any other anticipated coal mining activity. This is due to the nature and magnitude of vegetation removal, soil disturbance, and soil compaction associated with surface coal mining.

Coal mining also has a high potential to affect water and air quality through sedimentation from erosion, disruption of aquifers, use of heavy equipment, and introduction of dust particles into the air. The magnitude of effects depends on many factors, including the size of the area disturbed, the erodibility of soils disturbed, the steepness of the terrain, and the precipitation patterns in the area. Reclamation and proper mining techniques should offset these effects.

In situ coal development could occur on 2,500 acres in all alternatives. Surface disturbance from in situ development would be less than that from surface mining. Roads, drill pads, surface facilities, and pipelines would cause most of the disturbance. Most impacts from in situ coal development should be mitigated through reclamation because the duration of activity for this type of development is shorter and less surface is disturbed. Impacts from subsurface and surface coal mining, in which the duration of activity is longer and disturbance is more drastic, should be mitigated somewhat by reclamation in the short term. In the long term, these impacts should be mitigated by reclamation after activities ended and vegetation communities became more established.

Management Actions for Recreation

Areas designated for limited ORV use would confine to existing roads and trails such effects as compaction, soil displacement, and runoff channelization caused by wheeled vehicles.

In the Dune Ponds open ORV designation (150 acres), continued ORV use would affect soil, water, and air resources at an increasing rate. ORV use prevents revegetation of the sand dunes. Shifting sands would continue to bury downwind vegetation; thus, vegetation would be destroyed both on site and off site, increasing the amount of bare soil, reducing soil productivity, and increasing the area exposed to wind erosion. A riparian area downwind of the area might be buried in the long term. These effects would be great in and adjacent to the Dune Ponds ORV area, but they would not be consequential in the context of the planning area as a whole because of the small size of the area involved.

Management Actions for Soils, Water, and Air

Management actions for soils, water, and air in the Muddy Creek, Sage Creek, and Second and Third Sand Creeks watersheds would minimize potential soil compaction, vegetative cover removal, sedimentation of streams, degradation of air quality, erosion, and contamination of groundwater from surface-disturbing activities. The impacts mentioned would occur at lower rates in these watersheds than in other areas because surface disturbances would be more intensively managed to mitigate the effects.

Effects on Visual Resources

Management actions related to development of the Hanna Basin coal area would have an adverse impact on visual resources under all alternatives. The effects would occur specifically along the west side, where the area abuts the North Platte arm of Seminoe Reservoir. This is part of a VRM Class II area and also a popular fishing area. While coal development would not affect fishing, the visual quality of the area would be reduced if the leases were developed down to the reservoir.

Effects on Wildlife and Fisheries

Management Actions for Minerals (Coal)

Projected impacts on wildlife from leased and unleased coal areas that are common to all alternatives have been analyzed in detail in several EISs, as follows:

> China Butte, Medicine Bow, Rosebud, Seminoe II, and Red Rim coal tracts: U.S., Department of the Interior, Bureau of Land Management, *Draft Green River-Hams Fork Regional Coal Environmental Impact Statement* (Craig, CO 1980).
>
> Red Rim: U.S., Department of the Interior, Office of Surface Mining Reclamation and Enforcement, and Wyoming Department of Environmental Quality, Land Quality Division, *Draft Red Rim, Wyoming Petition Evaluation Document/Environmental Impact Statement* (n.p. 1983).
>
> Carbon Basin: U.S., Department of the Interior, Bureau of Land Management, *Proposed Coal Leasing in Carbon Basin Area, Wyoming* (n.p. 1979).
>
> Savery Preference Right Lease Application (PRLA) areas: U.S., Department of the Interior, Bureau of Land Management, *Savery Project Preference Right Coal Lease Applications: Draft Environmental Impact Statement* (Rawlins, WY 1982).
>
> Indian Springs; Wild Horse Draw: U.S., Department of the Interior, Bureau of Land Management, *Green River-Hams Fork Coal Region: Round Two Draft Environmental Impact Statement* (Craig, CO 1983).

Management Actions for Recreation

Only one area, Dune Ponds (150 acres), would be designated open to ORV use. This action is common to all alternatives. The area is already intensively utilized for ORV recreation; thus, there would no significant adverse impacts on wildlife. To the contrary, opening this area officially might reduce adverse ORV impacts on nearby waterfowl nesting and staging habitat by concentrating use in the open area. This action would therefore benefit important riparian/wetland habitat values.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE A

Introduction

Under Alternative A, present management practices would be continued on the basis of existing land-use plans.

The analysis of environmental consequences of this alternative was based on the anticipated levels of resource use or development. Some of these uses or developments are not management plans or proposals and are not listed as such in table 1 ("Comparison of Alternatives") in chapter 2. Rather, they represent feasible activities that could be expected to result from the management actions that would be carried out under this alternative. These uses or developments generally are dependent on market conditions beyond BLM control.

Anticipated Developments

Surface disturbance would be reclaimed as described under "Assumptions" at the beginning of this chapter. The assumed levels of development that were used in the analysis of Alternative A are presented here to give the reader a more complete understanding of the analysis. The following levels are projected for a 20-year period:

Clearcutting—2,500 acres (average of 125 acres per year)

Temporary logging roads—25 miles (average of 1.25 miles per year)

Land disposal—2,000 acres (average of 100 acres per year)

Surface disturbance from the following activities at the rates shown:

- Utility and transportation system development and maintenance—5,030 acres (average of 251.5 acres per year)
- Coal mining—4,000 acres (average of 200 acres per year)
- Oil and gas development—34,355 acres (average of 1,717.75 acres per year)
- Uranium mining—1,500 acres (average of 75 acres per year)

Effects on Cultural Resources/Natural History

Introduction

Assumptions about the effects of surface disturbance on cultural resources and natural history are discussed in the section on "Assumptions for Cultural Resources/Natural History."

Management Actions for Cultural Resources/Natural History

Under Alternative A, consideration would be given to transferring 160 acres in the proposed Gangplank NNL from federal ownership. The effectiveness of current BLM management is limited by lack of legal access to this 160-acre portion of the 80,640-acre area, the remainder of which is in other ownership. Transfer of the 160 acres could enhance management of the natural history values of the area or impair such management, depending on the management objectives of the party obtaining the lands.

Management Actions Involving Surface Disturbance

Anticipated levels of surface disturbance are discussed at the beginning of the analysis for this alternative. Actions involving surface disturbance would generate new inventory data about cultural, paleontological, and natural history resources. Such data are gathered in support of most surface-disturbing activities. The potential also exists for damage to cultural, natural history, and paleontological resources during surface disturbance. The data gathered and the potential for damage to irreplaceable resources are roughly proportionate to the amount of surface disturbance.

A total of 903,000 acres of the planning area would be withdrawn from locatable mineral development in this alternative. Of this acreage, 564,758 acres are in an oil shale withdrawal, most of which lies within the boundaries of the proposed Washakie Basin NNL. This area is characterized by high cultural resource and paleontological values. The withdrawals would protect cultural, natural history, and paleontological resources from potential disturbance due to locatable mineral development in the withdrawn areas. Outside the withdrawals, those resources could potentially be damaged by locatable mineral development, an activity that has more potential for such damage than most other surface-disturbing activities.

Surface disturbance in the Como Bluff NNL, the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail would be managed through standard protection requirements. This would help ensure the preservation of cultural, paleontological, and natural history resources in these areas.

Conclusion: Management actions for cultural resources/natural history common to all alternatives would help ensure the preservation and interpretation of these resources for present and future generations. Anticipated surface disturbance would generate new inventory data about cultural, paleontological, and natural history resources, but it also could damage those resources.

Transferring 160 acres in the proposed Gangplank NNL from federal ownership could enhance or impair management of the natural history values in the area, depending on the management objectives of the party obtaining the lands. Withdrawal of 903,000 acres from locatable mineral development would protect cultural, natural history, and paleontological resources from potential disturbance due to locatable mineral development in the withdrawn areas.

Effects on Forestry

Alternative A would continue existing planning decisions, including the present allowable harvest level and the current restrictions on timber harvesting. This alternative does not reflect new inventory data or current forest management knowledge in the determination of the allowable harvest level.

The commercial forestland in the planning area would be harvested at a rate of 12.5 MMBF per decade from an available base of 20,416 acres. Included in this acreage would be 3,404 acres of limited forest management activities. There would be no harvesting on 5,759 acres of commercial forestland.

The harvest level would be about 48% of the planning area's sustained yield capacity. Around 48% of the commercial forestland acreage would be harvested over the next 100 years.

In the short term, there would be no appreciable impacts on the forest resource from the forest management actions outlined under Alternative A.

In the long term, the condition of about 48% of the commercial forestland in the planning area would improve because mature and overmature trees would be removed and replaced with healthy reproduction. The success of insect and disease control measures would vary among specific sites and would depend on the timeliness and level of implementation of the control measures. The control activities would be constrained by an allowable harvest level significantly lower than the long-term sustained yield capacity.

Table 29 outlines the change in age class distribution of lodgepole pine that would occur over the next 100 years under Alternative A. An improvement in age class distribution would occur if Alternative A were implemented. However, there would still be an overabundance of acreage of trees more than 70 years old.

The condition of the commercial forestland that would not be harvested within the next 100 years (approximately 52% of the base acreage) would continue to deteriorate with increased insect, disease, and stagnation problems. These lands would not be harvested because the allowable harvest level is far below the sustained yield capability for the planning area.

Land consolidation on Elk Mountain would have a long-term beneficial effect on the forest resource because it would make possible more effective insect and disease control. Forest management activities would not be constrained by ownership boundaries; therefore, each problem area would be treated as an entity and in a timely manner, which would greatly improve the degree of success for the particular control measure. The condition of the forest would be improved in the long term.

TABLE 29

LONG-TERM (100 YEARS) AGE CLASS REDISTRIBUTION OF LODGEPOLE PINE UNDER ALTERNATIVE A

Age Class	Present Situation (percent)	Long-Term Change Under Alternative A (percent)	Ideal Age Class Distribution (percent)
0-10	6	5	10
10-40	15	15	30
40-70	14	15	30
70	65	65	30

This alternative would provide timber to the local wood products industry at about the same level as in the past 15 years. The average annual timber harvest under this alternative would be 1.25 MMBF. This level of production would account for 12 jobs in the planning area. The annual revenue generated by this harvesting would amount to about $920,000. At an average stumpage value of $20 per thousand board feet, the timber harvested would generate $25,000 per year in timber sale receipts to the United States government.

Conclusion: Alternative A would provide for improved forest health on about 48% of the commercial forestland. The no-harvesting restriction would prevent the development of a healthy productive forest on 5,759 acres of commercial forestland. The loss in productivity from harvesting restrictions could cause an eventual decrease in the planning area's sustained-yield capability. Wood products would be available to industry at about current levels. Consolidation of landownership on Elk Mountain would enhance the efficiency of insect and disease control in that area.

Effects on Lands Program

Under Alternative A, no land would be identified for disposal for community expansion. Communities in the planning area that are partially or totally surrounded by public land would not have the opportunity to acquire public land for expansion or community services. Affected communities might have difficulty meeting such needs. Real estate prices in affected communities could rise as growth put pressure on a limited land base.

Avoidance areas for utility/transportation systems would be identified case by case. Since the avoidance areas would be relatively few and small, effects on utility/transportation systems would be minimal.

Effects on Livestock Grazing

Introduction

Under Alternative A, livestock use would be licensed on demand up to the active preference level, 161,464 AUMs. Vegetation condition would be maintained or improved through management only on allotments with existing AMPs. No new AMPs would be developed. No change in season of use would be proposed under this alternative; however, requests for changes would be considered. Existing monitoring would be continued. Where necessary, new studies would be established case by case on "M" category allotments if changes in kind of livestock or season of use were requested.

See the Livestock Grazing appendix for an explanation of the calculations used to arrive at the estimated changes in AUMs.

Management actions for lands and minerals under this alternative would slightly reduce available forage in the Divide and Seven Lakes EIS areas. The acreage disturbed and not reclaimed (and therefore the acreage taken out of forage production) would amount to approximately 11,299 acres (1,883 AUMs) over the next 20 years. This is less than 1% of the available AUMs in the Divide and Seven Lakes portion of the planning area, and the loss would be minimal.

Some individual livestock operations could be directly affected by a lands or minerals action. If sufficient acreage was removed from the grazing base in an individual allotment, the livestock operator in that allotment might be forced to rent private pasture or to feed additional hay. The exact location and extent of future lands and minerals actions (and thus the effect on individual allotments) cannot be predicted.

No change in livestock grazing use would be proposed under this alternative for the Medicine Bow grazing EIS area. Existing data were used to predict how future ecological condition changes and the management actions discussed below would affect the availability of forage.

Management Actions for Forestry

The proposed clearcut harvest of 125 acres of sawtimber per year and the removal of 500 acres of noncommercial, nonproductive old age stands over the next 20 years would result in approximately 1,135 AUMs of additional forage available for livestock grazing in the long term. This is 50% of the total available to be grazed by livestock and wildlife from increased understory production due to harvest.

Management Actions for Lands and Minerals

The effects on livestock grazing from management actions for lands and minerals in the Medicine Bow grazing EIS area would amount to a loss of 4,436 acres (739 AUMs) from the public land grazing base in the next 20 years. Actions that would result in the above loss of available forage are land disposal (2,000 acres, 333 AUMs), utility and transportation systems (970 acres, 162 AUMs), locatable minerals (500 acres, 83 AUMs), oil and gas development (966 acres, 161 AUMs), and coal development (all acreage disturbed would be reclaimed).

Management Actions for Livestock Grazing

Livestock grazing use in the Medicine Bow grazing EIS area would be authorized up to 161,464 AUMs, the active preference level, upon demand. However, for analysis purposes it is assumed that licensed use would be equivalent to 147,024 AUMs, the last five-year average licensed use level over the grazing EIS area.

Trends in ecological condition over the grazing EIS area are expected to continue at current proportions (see table LVGR-AP-2 in the Livestock Grazing appendix). No action would be taken to reduce the competition for available forage between livestock and wildlife. Current utilization levels and seasons of use would continue throughout the grazing EIS area in the long term. The effect of continued competition for forage between livestock and wildlife would be a reduction in amount of forage available to livestock and wildlife over the long term.

Existing ecological condition and trend information for the grazing EIS area was used to predict how future ecological condition changes would affect the availability of forage. As discussed in the analysis of the effects on vegetation for Alternative A, trends in ecological condition in the Medicine Bow grazing EIS area are expected to continue in the present proportions. The estimated change in condition shown in table LVGR-AP-6 in the Livestock Grazing appendix was used to estimate the change in available forage production.

Current trends in ecological condition would continue as a result of continuation of present livestock grazing management practices in the grazing EIS area. This would result in a reduction in the availability of forage from the present 161,464 AUMs to 151,102 AUMs in the long term.

Conclusion: Current grazing management practices in the Medicine Bow grazing EIS area would continue under Alternative A. This would lead to a continued decline in ecological condition and trend, with a resultant decline in available forage. No management actions would be implemented to reverse current unacceptable conditions. Table LVGR-AP-6 in the Livestock Grazing appendix shows the estimated adjustment in authorized use, by allotment, that would result from management actions for livestock grazing in the long term. The total AUMs in the long term would be 151,102.

A total of 396 additional AUMs would be available in the Medicine Bow grazing EIS area in the long term as a net result of management actions for lands, minerals, and forestry. Therefore, the long-term total amount of forage available for livestock would be 151,498 AUMs. This figure is 6.17% below active preference and 3% above the five-year average licensed use level. Therefore, a reduction below the five-year average use level would not be expected to result from reduced production over the grazing EIS area.

Management actions for lands and minerals under Alternative A would reduce available forage in the Divide and Seven Lakes EIS areas by less than 1% over the next 20 years.

Effects on Mineral Resources

Leasable Minerals—Coal

A total of 49,780 acres containing 332.2 million tons of coal would be available for consideration for leasing. This would allow sufficient coal reserves to meet present demands. Other areas that have development potential (North Indian Springs, Northeast Cow Creek, Atlantic Rim) would not be considered. This would limit the flexibility of the coal management program and the BLM's ability to respond to changes in the demand for coal.

Leasable Minerals—Oil and Gas

Management Actions for Lands

The effects of "split estate" on mineral development are discussed under "Assumptions for Minerals" earlier in this chapter. These effects could occur under Alternative A on the 2,000 acres of public land available for disposal.

Management Actions for Minerals (Oil and Gas)

As discussed under "Assumptions for Minerals," surface protection requirements can affect the availability of oil and gas. Table 30 contains a list of the acreages that would be restricted under each alternative. Those acreages are not additive because some of the areas overlap. Without allowance for the overlap, a maximum of 16% to 17% of the federal mineral estate in the planning area would be affected by surface protection restrictions under Alternative A. Seasonal restrictions would be applied on 1.4 million acres, or 28% of the federal mineral estate in the planning area.

TABLE 30

ACREAGE AND LEASING RESTRICTIONS ON OIL AND GAS LEASING AND DEVELOPMENT UNDER EACH ALTERNATIVE

Alternative	Acreage under Seasonal Restrictions (percent of total)	Acreage under Surface Disturbance Restrictions (percent of total)	Acreage No-lease Category (percent of total)
A	1,400,000 (28)	841,895 (17)	0
B	1,400,000 (28)	1,510,270 (30)	37,560 (1)
C	895,000 (18)	657,511 (13)	0
D	1,400,000 (28)	1,086,720 (22)	0

Locatable Minerals

Management Actions for Lands

The effects of "split estate" on mineral development discussed earlier in this chapter could affect some of the 2,000 acres of public land that would be available for disposal under Alternative A.

Management Actions for Minerals (Locatable Minerals)

Under Alternative A, the planning area would be open to locatable mineral entry except for approximately 903,000 acres of existing withdrawals. These withdrawals have the effect of reducing the total potential mineral resource base of the planning unit. This long-term commitment of potentially productive areas would preclude mineral development.

Conclusion: Although sufficient coal would be available for leasing under Alternative A to meet demand, the flexibility to respond to changes in demand would be limited because three areas with development potential would not be available for consideration for leasing.

Surface protection restrictions would affect the availability of oil and gas on a maximum of 16% to 17% of the federal mineral estate in the planning area. Seasonal restrictions would affect the availability of oil and gas on 28% of the planning area.

Locatable minerals would not be available for development on 903,000 acres that would be withdrawn from locatable mineral entry.

Effects on Recreation

Introduction

The objective for recreation management under Alternative A would be to increase the availability of recreation opportunities. This would be accomplished by consolidating landownership on lands with high recreational value, obtaining access to areas of high recreational value, and providing for additional recreational developments.

Management Actions for Livestock Grazing

Improvements in 43.5 miles of aquatic habitat would enhance fishing opportunities on small streams that are underutilized or that do not now support a recreational fishery.

Management Actions for Minerals

Leasable Minerals—Oil and Gas

Under Alternative A, 445 acres in existing recreation sites would be protected from oil and gas development. Surface disturbance would not be allowed within ¼ mile of the North Platte River. This would prevent any conflict between recreationists and oil and gas development activity in the North Platte River SRMA.

If oil and gas activity in the planning area should result in substantial adverse impacts on big game populations, the quality of hunting in the area could be adversely affected.

Locatable Minerals

Under Alternative A, the C&MU withdrawal of 3,916 acres would protect Bennett Peak, Corral Creek, Teton Reservoir, Dugway, Pryor Flat, Shirley Mountain, and Nine Mile Hill existing or proposed recreation sites from potential disturbance associated with mineral development. Prospect Creek, Jelm Mountain, Battle Mountain, Encampment River, and Big Creek recreation sites would not be protected by withdrawal.

There is low potential for locatable mineral development around the Prospect Creek, Jelm Mountain, and Battle Mountain proposed recreation sites. Therefore, little effect from locatable mineral development would be expected in these areas.

There is moderate potential for locatable minerals around the Encampment River and Big Creek recreation sites. If mineral development occurred on these sites, there would be a considerable loss of use by visitors. Visitation in 1985 was estimated to be 4,500 visits at the Encampment River recreation site (traffic counter data). No visitation data are available for Big Creek. Mineral development in these sites would necessarily preclude recreational uses; thus, a minimum of 4,500 recreation visits would be lost if these sites were subject to mineral development.

Under this alternative, there would be no additional withdrawals from mineral entry on land adjacent to the North Platte River. This means that there could be conflicts between mineral development and recreation in areas that have high value for recreation and moderate or high potential for locatable minerals. Two stretches of river—one adjacent to Bennett Peak (1,410 acres) and one adjacent to Big Creek (795 acres)—have moderate or high potential for minerals and also are important for fishing. (The quality of the experience can be measured not only in the quality of fishing but equally in the quality of the natural setting in which the activity occurs.) There are no mineral claims now in either area, but there is no assurance that interest in mining will remain low. Therefore, in the long term there would be no assurance under this alternative that the quality of the recreation experience would remain intact.

Management Actions for Recreation

Under Alternative A, consolidation of landownership in the Elk Mountain and Bennett Peak areas could be beneficial to recreation. If landownership were consolidated, recreationists would not need to be concerned about different access requirements on lands under various ownerships. This could enhance recreation opportunities, including hunting and fishing.

Allowing ORV use on existing roads and trails in the Sand Hills area would maximize recreational ORV use in the area.

Conclusion: Recreation resources could be adversely affected under Alternative A by potential mineral development on some recreation sites and along important portions of the North Platte River that would not be withdrawn from locatable mineral entry.

Recreation opportunities could be enhanced by landownership consolidation. Improvements in aquatic habitat would enhance fishing opportunities on small streams. New access to federal lands and new recreation developments (both common to all alternatives) also would benefit recreation.

Effects on Soils, Water, and Air

Introduction

The section on "Assumptions for Soils, Water, and Air" describes the assumptions about impacts presented in this analysis.

Management Actions for Forestry

Under Alternative A, 17,012 acres (15% of the forestlands) would be intensively managed for forest products. In the long term, forest management actions would improve the health and vigor of the forest, reducing the chance of widespread loss of forest vegetation through insects, disease, and fire. Ensuring good vegetative cover would reduce accelerated erosion and improve or maintain water quality in the long term.

Timber harvest would cause surface disturbance in intensively managed areas. The potential for short-term acceleration of erosion, local degradation of air quality, and degradation of water quality above acceptable levels is high, but proper timber harvest techniques would be expected to keep these effects to a minimum. Long-term effects of forest management actions are summarized above.

Precommercial thinning would total about 650 acres in the next 20 years. About 500 acres of nonproductive, stagnated stands also would be removed and replaced with new, vigorous trees. This would have minimal short-term effects on soil, water, and air resources because the methods employed would cause little surface disturbance. Long-term benefits would result from this action, as described above.

Removal of trees would have the effect of producing additional runoff. This is because trees transpire large quantities of water, and clearcut and thinned areas tend to accumulate more snow than densely forested areas (USDA, FS 1985). The additional runoff would not be expected to cause the effects of downcutting and gullying described in "Assumptions for Soils, Water, and Air" because of the relatively small area cut at any one time and because of mitigative measures used in the design of forest management activities.

Harvest activities would be restricted on 3,404 acres (3% of the forestlands) to protect soil and watershed values. Effects from this limited harvesting would be minimal because of the harvest restrictions.

Harvesting would be prohibited on 5,759 acres (5% of the forestlands). In the short term this would prevent potential accelerated erosion, local degradation of air quality, and degradation of water quality. However, over the long term the health and vigor of the forest would decline, increasing the chance of widespread loss of commercial forest vegetation through insects, disease, and fires. Such a loss of vegetative cover would increase erosion and degrade water quality. The effect of insect and disease losses would be expected to be minimal because vegetation loss would be gradual over time, with replacement by understory vegetation.

Management Actions for Livestock Grazing

No new grazing systems are proposed in this alternative. Allotments with a downward trend would be expected to continue in a downward trend. Vegetative cover generally would be reduced as condition declined. This would lead to increased rates of erosion. Accelerated erosion would degrade water quality by increasing salt and sediment loading.

Approximately 900 acres of riparian habitat along the Miracle Mile could become degraded through continued livestock grazing. Stream banks would become more susceptible to erosion as vegetation condition declined in this area. As a result, sediment load in the North Platte River and Pathfinder Reservoir would increase.

Management Actions for Minerals

Leasable Minerals—Coal

The effects of coal mining for Alternative A would be the same as those described under "Effects of Management Actions Common to All Alternatives."

Leasable Minerals—Oil and Gas

Surface disturbance from oil and gas exploration and development would be restricted on up to 841,895 acres of steep slopes, riparian areas, perennial surface water, historic trails, VRM Class I and II areas, recreation sites, sage grouse leks, and high priority wildlife habitat. Surface disturbance on these areas would be mitigated through application of standard protection requirements. This should maintain water and air quality and prevent unacceptable rates of accelerated erosion in these areas.

Surface disturbance from oil and gas exploration and development would be restricted seasonally on 1.4 million acres to protect wildlife at critical times. Most seasonal restrictions would be applied in the spring when soils are wet and water is flowing in ephemeral drainages. Soils are most susceptible to erosion and compaction in spring, and water quality is most susceptible to degradation. Thus, the seasonal restrictions for wildlife have the coincidental effect of providing some protection of soils and water quality during this vulnerable time.

Locatable Minerals

Approximately 903,000 acres would be withdrawn from locatable mineral activities under this alternative. Locatable mineral exploration and development involves use of vehicles and heavy equipment, which can cause compaction and physical disturbance of soils and removal of vegetation. Withdrawal would prevent potential accelerated erosion and degradation of water and air quality that could result from these activities.

Under this alternative 41,245 acres of public water reserves would be withdrawn from nonmetalliferous mineral entry. Many of these withdrawals are associated with riparian areas. Although the potential effects discussed in the preceding paragraph could not result from nonmetalliferous mineral development, development of metalliferous minerals could occur. However, effects would be expected to be minor because few of these withdrawals have been developed for metalliferous minerals in the past, and this trend is not expected to change in the future.

Management Actions for Wildlife and Fisheries

Management actions for wildlife under Alternative A would protect riparian areas, improve vegetative cover, and reduce surface disturbance on 783,850 acres. This also would benefit soil, water, and air resources by restricting surface disturbance and reducing the potential for resulting accelerated soil erosion.

Conclusion: Intensive forest management on 17,012 acres (15% of the forestlands) would lead to minor acceleration of soil erosion, local degradation of air quality, and degradation of water quality, but proper timber harvest techniques would keep these effects to a minimum. Over the long term, forest management would help ensure good vegetation, which would reduce erosion and improve water quality.

Restricted harvest on 3,404 acres (3% of the forestlands) would have minimal effects. On 5,759 acres (5% of the forestlands) where harvesting would be prohibited, the decline in health and vigor of the forest could increase erosion and degrade water quality in the long term if wildfire should occur.

Continuing downward trend in ecological condition would lead to increased rates of erosion in some grazing allotments. Sediment load in the North Platte River and Pathfinder Reservoir could increase with degradation of approximately 900 acres of riparian habitat along the Miracle Mile.

Water and air quality would be maintained and unacceptable rates of accelerated erosion prevented by surface disturbance restrictions applied to oil and gas activities on 841,895 acres and seasonal restrictions on 1.4 million acres. Withdrawal of 903,000 acres from locatable mineral entry would help to prevent potential accelerated erosion as well as degradation of water and air quality from associated activities.

Management actions for wildlife to protect riparian areas, improve vegetative cover, and reduce surface disturbance on 783,850 acres would restrict surface disturbance, thus reducing the potential for resulting accelerated soil erosion.

As in all alternatives, installation of utility and transportation systems and other facilities would increase soil erosion, increase sedimentation during construction, and increase dust particulates in the air. Coal mining and some locatable mineral mining have a higher potential to cause unacceptable rates of accelerated erosion on specific sites than other anticipated activities. They also have a high potential to affect water and air quality. Management actions for soils, water, and air in the Muddy Creek, Sage Creek, and Second and Third Sand Creeks watersheds would minimize potential soil compaction, removal of vegetative cover, sedimentation of streams, degradation of air quality, accelerated erosion, and contamination of groundwater in those areas.

Effects on Vegetation

Rangeland Vegetation

As discussed under "Assumptions for Vegetation," actions for livestock grazing and wildlife are the only actions that would have a material effect on the condition and trend of rangeland vegetation.

Under Alternative A, livestock use would be licensed up to the active preference level upon demand. Maintenance or improvement of vegetation condition through management would occur only on allotments with existing AMPs. No new AMPs would be developed to improve vegetation condition. No change in kind of livestock or season of use would be proposed under this alternative; however, requests for changes would be considered. Ecological condition and vegetation trend would decline in the Medicine Bow grazing EIS area over the long term.

Alternative A would result in a 7% decline in ecological condition in the grazing EIS area in the long term. Projected changes in ecological condition and trend, by allotment, are shown in table LVGR-AP-6 in the Livestock Grazing appendix. The long-term changes in ecological condition and vegetation trend mentioned above would result from continuation of existing management.

No actions would be proposed to reduce the competition for available forage between livestock and wildlife in portions of the grazing EIS area. Rangeland projects would be implemented only to solve site-specific problems as necessary to maintain existing AMPs.

Declines in vegetative condition in portions of the grazing EIS area can be attributed to existing management actions. Some of these are improper distribution of grazing animals, heavy stocking rates, overuse of the vegetation by livestock and wildlife, turnout dates and seasons of use that are not consistent with range readiness, and lack of AMPs that provide for rest during some part of the growing season. The adverse impacts on ecological range condition and trend of vegetation resulting from these existing management actions are discussed below.

Improper distribution of grazing animals results in the concentration of animals in specific areas such as the meadow vegetation type while adjacent areas receive little or no grazing pressure. On cattle ranges, the most accessible areas (such as valley bottoms, low saddles between drainages, areas around water holes, and level mesas) are utilized first. Steep areas and areas far from water are less used. If allowed to continue year after year, concentration of grazing animals results in a decline in the vegetation vigor, seed production, litter accumulation, ecological condition, and vegetative trend.

The adverse impacts on vegetation from heavy stocking rates would result in deterioration of vigor and reduced production of key management species. This would lead, in turn, to reduced range condition or total loss of certain species from individual vegetation communities, or both. As increased amounts of herbage are removed from individual plants, the ability of the plants to produce and store reserves declines. This increases the loss of plants from the community and reduces the size of the remaining plants.

Cook and Stoddart (1963) verified the harmful effects of increased grazing intensity, indicating that the percentage of plants killed and the percentage of reduction in crown cover would increase with an increase in the intensity of forage removal. This deterioration also would be caused by the existing periods of use, which allow early livestock turnouts (April and May) in some allotments. In addition, some livestock permittees in the grazing EIS area are licensed for various periods of winter use. This means some areas are subject to nearly yearlong livestock grazing.

There is a considerable body of literature that indicates that the existing periods of use in the grazing EIS area would have adverse effects on the vigor of key management species. Trlica and others (1971) indicated that depletion of carbohydrate reserves is believed to be a primary factor for loss in plant vigor and subsequent range deterioration. Bywaum and Trlica (1977) said that defoliation of plants during susceptible periods can reduce the ability of the plants to maintain growth and vigor.

The time of defoliation is very important in determining the ability of individual plants to recover. Stoddart, Smith, and Box (1975) identified two critical periods in the growth of forage grasses: (a) the period of active reproduction, from flower-stalk formation to and including seed ripening; and (b) the forepart of the normal carbohydrate-storage period. Pearson (1964) suggested that as root reserves are depleted during critical growth periods, plants become highly susceptible to injury. The present periods of use would result in further losses of root reserves, which would cause a continued decline in vigor. Declining vigor would result in further degradation of vegetation communities, which in turn would result in poorer range condition.

At present there are four allotments in the planning area that have AMPs. However, most of these AMPs are not meeting the objectives for which they were established (increasing ecological range condition by improving species composition, vigor, health, and reproduction). Remaining allotments exhibit localized distribution and overuse problems, and they have early spring turnouts of livestock, which typifies heavy continuous livestock use. Heavy continuous grazing is known to result in a deterioration of the vigor and species composition of the vegetation resource. Such practices would continue the present trend of downward ecological range condition.

On the basis of the information on the effects of stocking rates on vegetation mentioned above, it is anticipated that the continued heavy utilization of the vegetation resource would cause further degradation of the vegetation communities; thus, heavy grazing intensity (overuse) would contribute to the significant adverse impact on ecological range condition and trend of vegetation communities within the grazing EIS area. The existing periods of use also would contribute to the overall adverse impact of a declining ecological range condition and trend in the grazing EIS area.

Riparian Vegetation

Riparian vegetation generally would be maintained in its current condition class or would decline. Current resource uses would have an adverse effect on riparian vegetation.

Rare Plants

No effects on Gibben's beardtongue would be expected because the known population is fenced and a trend study is in place.

The population of persistent sepal yellowcress could possibly be affected by weed control practices. However, this is not likely to occur since the BLM's normal review of proposed weed control projects and environmental analysis should include adequate consideration of the effect on the population.

The Muddy Gap cushion plant community could possibly be affected by surface disturbance from ORV use and locatable mineral development. The community lies mostly on steep slopes in an area where ORVs are limited to existing roads and trails, so effects from ORV use are not likely. The area is known to contain limestone deposits that may be of locatable quality, so the community could be disturbed by exploration and development of limestone deposits. Such disturbance is not considered likely since no claims have been filed on the area.

Conclusion: Under the No Action alternative, ecological condition and vegetation trend would continue to decline over the grazing EIS area. As shown in table LVGR-AP-6, the ecological condition would be expected to decline by 7% under this alternative. Riparian vegetation generally would be maintained in its current condition class or decline. Adverse effects on rare plants would not be expected.

Effects on Visual Resources

The goal of visual resource management under Alternative A would be to minimize adverse effects on visual resources while maintaining the effectiveness of land-use allocations.

Surface disturbance from oil and gas activity would be restricted on 194,000 acres of VRM Class I and II areas. These are areas of high scenic values on which development activity could have the most adverse impacts. However, limitations on surface disturbance would prevent impacts on visual resources from oil and gas development.

Conclusion: Alternative A would provide maximum protection of visual resources.

Effects on Wildlife and Fisheries

Introduction

Present management practices, which are based on existing land use plans, would continue under Alternative A. Maintenance and implementation of existing and planned habitat improvement projects would be accomplished primarily on the six existing HMP areas. Standard protection requirements would continue to be applied as appropriate.

Program emphasis would continue to be on maintaining or improving wetland/riparian and fisheries habitat, maintaining or improving high priority habitat types, and maintaining or improving important habitat such as crucial winter ranges and raptor concentration areas for featured species, including threatened or endangered species.

The Wildlife appendix contains detailed discussion of typical impacts on wildlife and fisheries from various types of activities.

Management Actions for Forestry

Under Alternative A, intensive timber harvesting and management would be carried out on Shirley Mountain, Elk Mountain, Jelm Mountain, the Laramie Peak area, and the Medicine Bow National Forest fringe. At the present level of harvest (1,250 acres clearcut in ten years) with the proposed harvest restrictions, the rejuvenation of timber stands, increased stand age-class diversity, and the creation of desirable forage areas would have a long-term beneficial effect on elk, deer, and bighorn sheep.

Maintaining the 40% to 60% cover-forage ratio and closing roads as soon as possible after timber sales end would be especially beneficial for elk.

The harvesting of other wood products such as poles, firewood, and wildlings is minimal at present, and it is expected to remain at the present level. This level would have a minimal effect on wildlife resources.

All timber sales would incorporate fish and wildlife needs to maintain or improve habitat conditions. Keeping clearcuts small (less than 25 acres) with irregular edges would ensure adequate cover for elk and deer. Rejuvenation of decadent aspen stands by cutting would benefit fish, beaver, and accipiters. Management under the current HMP for Shirley Mountain emphasizes the closing of existing access routes that are creating extensive avoidance zones for elk.

Forest stringer habitat in forest fringe areas provides edge, cover, and migrational corridors between summer and winter ranges for elk, deer, and other wildlife. These areas would be maintained in the short term. However, these harvest areas are now stocked with overmature lodgepole pine and are ripe for beetle attack and wildfire. At the present rate of timber harvest, many forest fringe stands will be killed by beetles or wildfire before they can be harvested. This would have a long-term adverse impact on elk, deer, and many other wildlife species. In addition, opportunities to enhance wildlife habitat would be lost by not harvesting. Forest age-class diversity would be less following massive beetle kill than with scheduled harvesting. This also would result in less edge effect and less diverse forage communities.

Increased human activity would have an adverse effect on wildlife in the short term. In addition to direct habitat loss from road construction, there could be considerable habitat loss for elk, deer, and possibly bighorn sheep from the establishment of avoidance zones associated with the roads. This would be a short-term impact because most roads would be closed upon termination of each timber sale. In the long term, the beneficial effects from timber harvesting would far outweigh the short-term adverse impacts associated with road construction.

Management Actions for Livestock Grazing

Grazing impacts on wildlife for the Divide Resource Area have been analyzed previously in the Divide and Seven Lakes grazing EISs. Most of this analysis is, with minor adjustments, directly applicable to the Medicine Bow Resource Area, as follows.

Alternative A would result in a continuation of the existing situation for wildlife. Many high priority habitat types would continue to be overused, resulting in a deteriorated state of vegetative structure and diversity. The abundance and species diversity of the wildlife community would remain below the full potential of the habitat types.

Limited areas of habitat within allotments under certain existing grazing systems would continue to show some improvement. This improvement would produce a positive response within the wildlife community. Some areas of habitat (Bennett Peak, Encampment, Baggot Rocks, and Miracle Mile) would continue to deteriorate because of excessive use by grazing animals, thereby producing greater interspecific competition for food, cover, and space. The continued deterioration of these habitats might result in their long-term loss and/or reduced grazing capacities.

Additional unplanned site-specific range improvements that could be either adverse or beneficial are addressed in the section on typical impacts from grazing in the Wildlife appendix.

Changes in kind of livestock from sheep to cattle generally would have an adverse impact on riparian habitat unless intensively mitigated (see "Typical Impacts from Livestock Grazing" in the Wildlife appendix).

For a discussion of the fisheries variables and assumptions used in this analysis, see "Assumptions for Wildlife and Fisheries" earlier in this chapter.

Under Alternative A, there would be an overall negative effect on trout stream habitat in the Medicine Bow grazing EIS area. For the most part, trends in this area, whether upward, static, or downward, would continue. This has been defined as a neutral effect. However, in allotments in which sheep eventually would be replaced by cattle, there would be a negative effect since a downward trend in stream habitat condition probably would be initiated.

No positive effects on stream habitat would result from intensified grazing management because AMPs with stream maintenance and improvement objectives would not be developed, and no additional areas would be excluded from grazing. Development of new reservoirs with potential to support stocked trout would be unlikely under this alternative.

In the portion of the planning area covered by the Divide RPS (USDI, BLM 1984a), there would be positive effect in "I" category allotments affecting a maximum of 43.5 miles of trout stream. (There are no trout streams in the Seven Lakes RPS area). Negative effects would result from conversion to cattle in some allotments. No large reservoirs would be likely to be constructed under this alternative.

Management Actions for Minerals

Leasable Minerals—Coal

As stated in the section on effects from management actions common to all alternatives, coal areas available under all alternatives (excluding Hanna Basin) have been analyzed in detail relative to impacts on wildlife species and their habitat. The following is an overview of the results of those analyses.

Should coal development activity increase in the areas mentioned, industrial and urban development and known population growth in the region would have the most pervasive adverse cumulative effects on wildlife. Impacts resulting from this development and growth are discussed in the section on typical impacts on wildlife from coal activity in the Wildlife appendix. With an increase in growth and development, secondary wildlife impacts would increase.

The mine sites alone would have minimal effects on regional pronghorn and mule deer populations. This is largely because little crucial winter range would be affected and because the coal areas are spread over several big game management units. Red Rim is the only area where there could be consequential adverse effects on crucial winter range (antelope).

The regional elk population (Baggs elk herd) could be affected by development of the Savery preference right lease application (PRLA) areas, depending on the degree of mitigation and its effectiveness. The draft Savery EIS (USDI, BLM 1982) discusses these impacts. The preferred alternative for those PRLA areas (in the Savery EIS) is the "no development" alternative. Addition of a development scenario would depend on the final showing of economic feasibility within mitigative constraints.

Impacts on sage grouse would be localized. Regional impacts resulting from the mining operations alone would be minimal. Most habitats that would be altered are moderate or low priority habitats. Alteration of the low to moderate priority habitats would be considered inconsequential.

The cumulative effect of mining on raptors is not entirely clear. Highwalls left after mining in the Hanna Basin have been shown to benefit golden eagles by increasing limited nesting substrates. However, the Surface Mining Control and Reclamation Act (SMCRA) normally requires reclamation of highwalls. The effect on prairie falcons and ferruginous hawks is not clear.

Impacts on wildlife from the active coal mines in the Hanna Basin have been mixed. A total of 15,495 acres of habitat has been altered, with 6,176 acres reclaimed. Species favoring reclaimed areas have benefited while other species have lost habitat or have been displaced.

It is difficult to determine a cause and effect relationship between mining activity and effects on wildlife in the Hanna Basin. Wildlife populations fluctuate, sometimes widely, in response to natural factors such as cycles in the abundance of prey base or extremes in seasonal weather (for example, severe winters). Without a control treatment, it is not feasible to separate the impacts on wildlife resulting from mining from the impacts caused by natural factors.

Overall wildlife impacts at a given mine site would be determined by the premining values and by what species the reclaimed area would support. These factors would vary from site to site and would depend upon which species and habitat the land manager wants to manage for.

Leasable Minerals—Oil and Gas

Under Alternative A, five million acres would be open to oil and gas leasing with application of standard protection requirements. Riparian areas, sage grouse strutting grounds, sharp-tailed grouse dancing grounds, and known habitat for threatened or endangered species would be protected from surface disturbance.

Seasonal restrictions during critical periods would eliminate stress, disturbance, and displacement caused by oil and gas activities. This would protect big game on crucial winter ranges, elk on calving areas, sage grouse and sharp-tailed grouse in nesting habitat, and raptors during the nesting period. Seasonal restrictions during critical periods also might help to reduce mortality, ensure reproductive success and survival of young, and reduce conflicts with owners of adjacent property that could be caused by displaced animals. During nonstipulated periods, these restrictions would not be in effect to protect wildlife. Should production be established or field development become a reality, physical loss of habitat and the creation of avoidance zones could cause long-term detrimental impacts on big game, raptors, and other wildlife species.

Seasonal stipulations currently protect the annual production on known nesting sites for featured raptor species. However, these stipulations do not protect sites during the nonnesting period. It is possible that considerable oil and gas development could take place in important raptor areas, causing extensive surface disturbance accompanied by human activity. This would make the areas unsuitable for raptors and therefore unavailable to them. Long-term detrimental effects on local raptor populations could result from this habitat loss and consequent reduction in reproduction.

Raptors were intensively inventoried for nesting activity in 1980 and 1981 and in 1986. Thoroughness of the inventories varied among species, with the greatest emphasis being on ferruginous hawks, golden eagles, and prairie falcons. Monitoring of known nests has been inconsistent, so that conclusions relative to population status and long-term trend are not possible.

Fisheries, steep slopes, and riparian areas would be protected from surface disturbance, which would result in reduced alteration or loss of habitat for fish, waterfowl, game birds, beaver, big game, and a wide variety of birds and other animals. The high priority standard habitat sites associated with riparian areas and steep slopes also would be protected from oil and gas disturbances. These actions would protect 140,900 acres (3% of wildlife habitat in the planning area).

Prairie dog colonies have not been thoroughly inventoried in the planning area. Prairie dog colonies not previously located probably would be found during the processing of each APD. Black-footed ferret searches would then be completed before any surface disturbance occurred, which would prevent potential adverse effects on black-footed ferrets.

Some important and crucial wildlife habitats overlap KGS areas and areas of high and moderate oil and gas potential. Table 31 indicates the extent of overlap of big game, sage grouse, and raptor habitat with such oil and gas areas. Consideration of these overlapping areas indicates the following.

> Habitat losses caused by oil and gas activities could have significant long-term adverse impacts on raptor populations in the planning area over the next 25 years.
>
> Habitat losses caused by oil and gas activities could have significant long-term adverse impacts on the Baggs elk and mule deer herds over the next 25 years.
>
> Habitat losses caused by oil and gas activities could have negative long-term effects on antelope herds over the next 25 years in the Ferris-Seminoe and Jelm Mountain areas.
>
> Long-term effects on sage grouse populations in the planning area would be minimal over the next 25 years.

Locatable Minerals

Withdrawals. Under Alternative A, 903,000 acres would be withdrawn from locatable mineral entry. Included in this acreage are 564,758 acres withdrawn for oil shale classification. In the south desert area west of Baggs, 18,300 acres of crucial

TABLE 31

ACREAGE OF BLM-ADMINISTERED PUBLIC LAND IN HIGH IMPORTANCE WILDLIFE HABITATS OVERLAPPING AREAS WITH OIL AND GAS POTENTIAL

HMP Areas	Crucial Elk Winter Range	Elk Calving Range	Crucial Mule Deer Winter Range	Crucial Antelope Winter Range	Bighorn Sheep Winter Range	Breeding/Nesting Area[1] Acreage (Number of Leks)	Raptor Nesting Concentration Areas[2]
Known Geologic Structures							
Baggs	2,640		26,800	25,800		39,420 (5)	22,900
Ferris/Seminoe			2,240	9,500		8,600 (0)	250
Shirley Mountain			130	320			
Sage Creek Basin						300 (0)	300
Encampment Bighorn Sheep							
Red Desert				1,900		114,200 (10)	
South Desert[3]			19,800	70,500		42,840 (8)	14,740
Saratoga Valley[3]			200	1,700		3,120 (1)	
Laramie Peak[3]							
Jelm Mountain[3]				130			
Other						680 (0)	200
Total	2,640		44,170	109,850		209,160 (24)	33,390
High Potential Oil and Gas Areas							
Baggs	21,280		25,200	21,000		57,500 (13)	6,100
Ferris/Seminoe			2,250	12,800		29,440 (6)	300
Shirley Mountain			3,500	3,200		4,920 (2)	
Sage Creek Basin						2,400 (1)	1,800
Encampment Bighorn Sheep							
Red Desert				7,900		64,700 (10)	
South Desert[3]			36,700	1,800		960 (0)	
Saratoga Valley[3]			2,400	10,100		6,040 (0)	
Laramie Peak[3]							
Jelm Mountain[3]				500			
Other						320 (0)	
Total	21,280		70,050	57,300		166,280 (32)	8,200
Moderate Potential Oil and Gas Areas							
Baggs	54,800	1,800	17,200	3,400		63,580 (11)	900
Ferris/Seminoe			15,500	27,000	800	30,720 (4)	21,250
Shirley Mountain	7,800		20,800	66,700		57,760 (10)	
Sage Creek Basin			3,100			9,700 (1)	5,900
Encampment Bighorn Sheep							
Red Desert				36,900		58,500 (6)	17,280
South Desert[3]			1,100				
Saratoga Valley[3]	3,300		23,800	38,250		94,880 (20)	5,440
Laramie Peak[3]				4,500		8,520 (2)	
Jelm Mountain	3,400	1,240	950	16,800		3,360 (1)	
Other			5,000			1,900 (0)	
Total	69,300	3,040	87,450	193,550	800	328,920 (55)	50,770

[1] Includes known habitat and areas believed to be sage grouse habitat.

[2] Does not include isolated nests.

[3] Proposed HMP area.

winter range for mule deer overlap the oil shale withdrawal area. Because of economic infeasibility, oil shale development would not occur; thus, there would be no adverse effects on wildlife. The withdrawal prohibits mineral entry, and since there are no existing claims, there would be no uranium mining. Therefore, physical habitat loss and disturbance would not occur. Maintenance of habitat would have positive effects on mule deer and other wildlife species.

Continuation of the withdrawal of 73,290 acres from mineral entry by the Bureau of Reclamation (BuRec) would protect wildlife species from surface disturbance. Most of these withdrawals are along Pathfinder and Seminoe reservoirs and do not include large amounts of crucial or important habitats for featured or sensitive species (such as crucial winter range for big game or raptor concentration areas). However, long-term benefits would be realized by bald eagles, which use the area. Winter hunting and scavenging areas for this endangered species would remain undisturbed, as would the perching and nesting habitat (cottonwoods) along the North Platte River between Pathfinder and Seminoe reservoirs.

Continuation of the withdrawal of 810 acres currently withdrawn on Bennett Peak would protect elk, mule deer, and bighorn sheep on crucial winter range.

A total of 41,245 acres of public water reserves are withdrawn from nonmetalliferous mineral entry. These reserves, which are scattered throughout the planning area, generally are associated with water sources such as streams or reservoirs, and thus frequently with riparian habitat. The prevention of surface disturbance from nonmetalliferous mining in high priority riparian habitat benefits fish and wildlife. There could be long-term adverse impacts from riparian degradation in specific sites if metalliferous mineral mining should increase, but this effect would be minor.

A total of 207,186 acres are withdrawn from various types of locatable mineral entry for coal or coal classification. It is expected that little benefit for wildlife, if any, would result from these withdrawals.

A total of 15,897 acres of withdrawn lands are tracts or parcels of small acreage scattered throughout the resource areas. There would be little positive effect from these withdrawals in the planning area as a whole.

All lands not discussed above would remain open to mineral entry under this alternative. Potential conflicts and impacts from mineral activities are discussed in the following sections.

Uranium. Uranium exploration and assessment are limited in the planning area, with production occurring only at a slow rate in Shirley Basin. A market turnaround would be required for significant development to occur, and this is not expected through the mid-1990s. On the basis of this projection, it is expected that adverse impacts on wildlife through habitat disturbance from uranium activity would be localized and minor. If a market turnaround should occur, there could be detrimental effects on wildlife in several areas.

If uranium activity increased, production from the uranium ore body in the Ketchum Buttes area could have long-term impacts on the Baggs elk herd. Approximately 1,280 acres of crucial winter range for elk could be lost to surface disturbance, and human activity could create avoidance zones over a considerably larger area. Development of an ore body southwest of Red Rim could cause some habitat loss in crucial winter range for antelope; however, the amount of range involved would be minimal.

Historic disturbance of habitat by uranium mining in Shirley Basin over the past 31 years is roughly estimated at 7,000 acres. A substantial amount of this habitat has been reclaimed. Except for riparian habitat, no crucial or important wildlife use areas (such as crucial winter range or raptor concentration areas) have been lost as a result of this development.

It is estimated that as much as 100,000 more acres could be mined for uranium in Shirley Basin over the long term. Under current market conditions and production projections, adverse impacts would be minimal. If conditions should improve and production accelerate, sage grouse in the Shirley Basin could be adversely affected in the long term. Potentially, 11,000 acres of sage grouse breeding/nesting habitat could be lost through surface disturbance.

A potential WGFD program to reintroduce black-footed ferret sites in the Shirley Basin would not be affected by future uranium mining.

The Red Desert area contains nine potential areas for uranium mining comprising an estimated total of 50,000 acres. Historic activity has involved only one mine and less than 3,000 acres of habitat disturbance. The mine is now on standby and would possibly reopen with improved conditions. Improved market conditions and accelerated mining in the nine potential areas could result in adverse impacts on sage grouse and antelope. Surface disturbance could cause a loss of 27,200 acres of sage grouse breeding/nesting habitat in the long term. While no antelope crucial winter ranges would be affected, more than 50,000 acres of summer or winter/yearlong range could be lost through surface disturbance in the long term.

Metallic Minerals. Little mining activity, if any, for metallic minerals is occurring in the planning area. Some exploration and assessment are occurring at a low level, but there are no development plans because of market conditions.

A market turnaround could result in long-term adverse impact on several wildlife species. In the Bradley Peak and eastern Ferris Mountains area, disturbance of 640 acres of crucial winter range could have adverse effects on mule deer. Sage grouse nesting in the same area also would be negatively affected.

If development should occur in the area south of Encampment, there could be adverse impacts on elk, mule deer, and bighorn sheep. Surface disturbance could cause long-term losses of crucial winter rangeup to 2,075 acres for elk, 960 acres for mule deer, and 3,000 acres for bighorn sheep.

The Jelm Mountain area is considered to have good potential for gold production. Metallic mineral mining in that area could have long-term adverse impacts on elk and mule deer. Surface disturbance and human activity could cause long-term loss of 450 acres of elk calving habitat and 380 acres of crucial winter range for mule deer.

Bentonite. There is a low to moderate potential for bentonite mining in the vicinity of and north of Medicine Bow. If bentonite should be mined in this area, it could result in long-term adverse impacts on sage grouse and antelope. Potentially 5,600 acres of crucial winter range for antelope and 3,000 acres of sage grouse breeding/nesting habitat could be disrupted over the long term.

A potential WGFD program to reintroduce the black-footed ferret in sites southeast of Medicine Bow could be adversely affected by bentonite mining. That area has a lower potential for ferret reintroduction than Shirley Basin because of biological, political, and landownership considerations. Bentonite mining would destroy existing prairie dog colonies and eliminate the habitat, thus removing the area from consideration in the recovery process for black-footed ferrets.

Management Actions for Recreation

ORV use under Alternative A would be limited to existing roads and trails throughout the planning area. As the number of new roads continues to proliferate in association with energy and mineral exploration and development activities, these new roads then would qualify as existing roads. Thus, the value to wildlife from ORV restrictions depends on current energy and mineral development as well as on the potential for such development. Where potentials are low, the restriction would help protect habitat and wildlife during critical life cycle periods such as winter for big game and spring and summer for nesting raptors.

Restrictions on ORVs would reduce stress, disturbance, and physical habitat loss. Where oil, gas, and mineral potentials are moderate or higher, restrictions would be of limited value to the wildlife resource in the long term. For additional discussion of adverse impacts on wildlife caused by roads, see the "Typical Impacts from Oil and Gas" section of the Wildlife appendix.

Management Actions for Wildlife and Fisheries

Under Alternative A, existing fish and wildlife habitat improvements would be maintained and routine habitat improvement projects completed to enhance and maintain fish and wildlife resources. Standard protection requirements would be applied where appropriate to protect important fish and wildlife resources.

In all HMP areas, special emphasis would be placed on improving wetland/riparian and fisheries habitat. This would result in long-term benefits to a wide variety of fish and wildlife species associated with riparian and aquatic habitat.

Special emphasis would continue to be placed on protecting nesting raptors during the nesting period in all HMP areas. While protection during this critical period is beneficial, nesting habitat could be lost during the nonrestricted period.

Maintenance and improvement of high priority wildlife habitats would continue to receive special emphasis in the Divide Resource Area, providing long-term benefits to a wide variety of game and nongame species. There could be long-term detrimental impacts on a wide variety of wildlife species in the Medicine Bow Resource Area, where high priority habitats would not receive protection or special attention for maintenance or improvement.

The 12-acre white pelican colonial nesting island would not be designated an ACEC under Alternative A. If monitoring data indicated that disturbances were having a detrimental effect on the nesting colony, actions would be implemented to protect the colony and its habitat from disturbance. This would help ensure the continued viability of the nesting colony. However, the apparent decline in this species nationally is believed to be due partly to the sensitivity of white pelicans to predation and human disturbance. If protective actions were not implemented until effects were evident from monitoring data, disturbance thresholds could potentially be exceeded, which could jeopardize the continued existence of the colony.

Conclusion: Forestry actions under Alternative A would have both beneficial and adverse effects on wildlife. In the short term, surface disturbance and human activity would cause habitat loss, which would affect big game adversely. Forestry management designed to combat extensive beetle infestation would destroy large acreages of wildlife habitat but would provide long-term benefits to big game and a wide variety of other wildlife species. Forest age-class diversity and habitat diversity would be maintained or improved, and forest wildlife habitat guidelines would ensure that important habitat values would be maintained for big game (forage-cover ratios) and in riparian areas, as well as in habitat for raptors and cavity nesters.

Effects from livestock grazing management under Alternative A could be beneficial or adverse. High priority habitat types (including riparian types) would continue to be overused, which would result in deterioration of habitat quality. In limited areas where grazing systems are fostering habitat improvements, wildlife would benefit. Other areas (Bennett Peak, Baggot Rocks, Miracle Mile, and Encampment) would continue to deteriorate from excessive use by grazing animals. This would cause long-term adverse impacts on big game and a variety of other species.

Changes in kind of livestock from sheep to cattle generally would have an adverse effect on riparian habitat and a wide variety of species that are partially or totally dependent on riparian habitat.

Raptor populations could decline in areas that are open to oil and gas leasing over the next 25 years because of losses of important nesting habitats. Losses of important big game habitat caused by oil and gas activities also could cause serious declines in big game populations in the Baggs elk and mule deer herds and in antelope herds in the Jelm Mountain and Ferris-Seminoe areas.

Seasonal stipulations or restrictions requiring no surface disturbance would protect fish, waterfowl, game birds, beaver, big game, raptors, and a variety of other animals during critical periods. However, these restrictions would not prevent long-term adverse impacts on raptors and big game that could be caused by losses of important habitat during unrestricted periods.

The withdrawal of 903,000 acres from locatable mineral entry under this alternative would have positive effects on fish and wildlife. Antelope, mule deer, sage grouse, bald eagles, and a variety of other wildlife species would benefit from maintenance of their habitats in an undisturbed condition.

If market conditions for uranium improved, uranium mining could cause habitat loss that would have long-term adverse effects on the Baggs elk herd; mule deer, sage grouse, and antelope in the south desert area west of Baggs; sage grouse in the Shirley Basin area; and sage grouse and antelope in the Red Desert area.

Bentonite mining could cause habitat loss that would have long-term adverse effects on sage grouse and antelope in the vicinity of Medicine Bow. A potential black-footed ferret reintroduction site south of Medicine Bow could be eliminated.

Metallic mineral exploration and mining could have adverse impacts on mule deer in the Ferris-Seminoe area and on elk, mule deer, and bighorn sheep in the Encampment area.

In areas where oil and gas potential is low, ORV management actions limiting use to existing roads and trails would benefit wildlife species such as big game and raptors during critical periods by reducing the potential for disturbance. In areas of moderate or higher oil and gas potential, this restriction would be of limited long-term value because roads qualifying for use would continue to proliferate.

Management actions for wildlife and fisheries under this alternative would benefit wildlife in all HMP areas in both the short term and the long term. Existing habitat improvements would be maintained and routine habitat improvement projects completed to enhance or maintain fish and wildlife resources. Standard stipulations would be used to protect and maintain important wildlife habitat values such as high priority habitat types and to reduce disturbance and stress during critical periods. These actions would provide long-term benefits for raptors, big game, sage grouse, and a wide variety of other species.

A total of 43.5 miles of trout stream habitat in the Divide RPS area would be maintained or improved, while the other trout streams in the planning area would not be intensively managed. There would be some negative effects in both areas because the number of cattle in some allotments would increase. The overall effect on fisheries in the planning area would be neutral to slightly negative.

The continued viability of the nesting white pelican colony would be enhanced under this alternative. However, delays in implementing protective actions until monitoring indicated a need could jeopardize the colony's continued existence.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE B

Introduction

Under Alternative B, resource conflicts that occur under existing management would be resolved through restriction of surface-disturbing activities. This alternative generally would be more restrictive than present management; it would restrict activities that are causing problems with other resources.

The analysis of environmental consequences of Alternative B is based on the anticipated levels of resource use or development. Some of these uses or developments are not management plans or proposals and are not listed as such in table 1 in chapter 2. Rather, they represent feasible activities that could be expected to result from the management actions that would be carried out under this alternative. They generally are dependent on market conditions beyond BLM control.

Anticipated Developments

Surface disturbance would be reclaimed as described under "Assumptions" at the beginning of this chapter. The assumed levels of development that were used in the analysis of Alternative B are presented here to give the reader a more complete understanding of the analysis. The following levels are projected for a 20-year period:

Clearcutting—1,200 acres (average of 60 acres per year)

Temporary logging roads—12 miles (average of 0.6 miles per year)

Land disposal—none

Surface disturbance from the following activities at the rates shown:

Utility and transportation system development and maintenance—5,030 acres (average of 251.5 acres per year)

Coal mining—4,000 acres (average of 200 acres per year)

Oil and gas development—34,355 acres (average of 1,717.75 acres per year)

Uranium mining—1,500 acres (average of 75 acres per year)

Effects on Cultural Resources/Natural History

Introduction

Assumptions about the effects of surface disturbance on cultural resources and natural history are discussed in the section on "Assumptions for Cultural Resources/Natural History."

Management Actions for Cultural Resources/Natural History

No lands would be considered for disposal under Alternative B. The BLM would retain management of small tracts in the Gangplank proposed NNL and the Big Hollow and Sand Creek NNLs. The effectiveness of current BLM management is limited by the small proportion of public lands in these areas and by the fact that there is no legal access to the public lands.

Management Actions Involving Surface Disturbance

Anticipated levels of surface disturbance are listed at the beginning of the analysis for this alternative. The effects of generation of new inventory data and potential damage to cultural, paleontological, and natural history resources would be similar to those discussed for Alternative A, but on slightly less acreage.

A total of 919,355 acres of the planning area would be withdrawn from locatable mineral development under this alternative. The effects of protection of cultural, natural history, and paleontological resources from potential disturbance due to locatable mineral development in the withdrawn areas would be similar to those discussed for Alternative A, but on 16,355 more acres. The additional acreage includes intact segments of the Overland Trail, the Cherokee Trail, the Rawlins-Fort Washakie Trail, and the Como Bluff NNL. These areas contain high cultural and natural history values. Outside the withdrawals, those resources could be damaged by locatable mineral development, an activity that has more potential for such damage than most other surface-disturbing activities.

A total of 37,560 acres would be closed to oil and gas leasing. The Como Bluff NNL is included in this acreage. The closures would help ensure the protection of cultural, natural history, and paleontological resources from disturbance associated with oil and gas exploration and development.

Surface disturbance on the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail would be managed with application of standard protection requirements. This would help ensure the preservation of cultural resources in these areas.

Conclusion: Management actions for cultural resources and natural history common to all alternatives would help ensure the preservation and interpretation of these resources for present and future generations. The effects of generation of new inventory data and potential damage to cultural, paleontological, and natural history resources from anticipated surface disturbance would be similar to those discussed for Alternative A, but on slightly less acreage.

The BLM's effectiveness in managing the natural history resources would continue to be limited by retention of small tracts with no legal access in the Gangplank proposed NNL and the Big Hollow and Sand Creek NNLs.

Withdrawal of 919,355 acres from locatable mineral development would protect cultural, natural history, and paleontological resources from potential disturbance due to locatable mineral development in the withdrawn areas, which include intact segments of the Overland Trail, the Cherokee Trail, the Rawlins-Fort Washakie Trail, and the Como Bluff NNL.

Closing 37,560 acres to oil and gas leasing would help ensure the protection of cultural, natural history, and paleontological resources from disturbance associated with oil and gas exploration and development, including those in the Como Bluff NNL. Application of standard protection requirements would help ensure the preservation of cultural resources on intact segments of the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail.

Effects on Forestry

Implementation of this alternative would result in a reduced forest management program. A no-harvesting restriction would be placed on the commercial forestland along the national forest fringe. Therefore, these lands would be dropped from the available commercial forestland base.

The commercial forestland would be harvested at a rate of 6 MMBF per decade from an available base of 16,246 acres. Included in this acreage would be 624 acres of limited forest management activities. There would be no harvesting on 9,929 acres of commercial forestland.

The harvest level would be about 23% of the planning area's sustained yield capability. Around 23% of the commercial forestland would be harvested over the next 100 years.

In the short term, there would be no appreciable impacts on the forest resource from the forest management actions outlined under Alternative B.

In the long term, the condition of about 23% of the commercial forestland would improve because mature and overmature trees would be removed and replaced with healthy reproduction. Activities would be implemented in those areas to control insect and disease problems. The success of these activities would be site specific and dependent on the timeliness and the level of implementation of the control measures.

Table 32 outlines the change in age class distribution of lodgepole pine that would occur over the next 100 years under Alternative B. This table shows that a great imbalance in age class distribution would occur if Alternative B were implemented.

TABLE 32

LONG-TERM (100 YEARS) AGE CLASS REDISTRIBUTION OF LODGEPOLE PINE UNDER ALTERNATIVE B

Age Class	Present Situation (percent)	Long-Term Change Under Alternative B (percent)	Ideal Age Class Distribution (percent)
0-10	6	2	10
10-40	15	6	30
40-70	14	6	30
70	65	86	30

The condition of the commercial forestland that would not be harvested within the next 100 years (approximately 77% of the base acreage) would continue to deteriorate with increased insect, disease, and stagnation problems. These lands would not be harvested because of the restrictions placed on harvesting, and because the allowable harvest level is far below the sustained yield capability for the planning area.

This alternative inadequately addresses the mountain pine beetle problem in the no-harvesting areas. Calculations made according to the risk rating system developed by G. C. Amman and others (USDA, FS 1977) indicate that mortality losses in the no-harvest areas could total 24 MMBF, or around 300,000 trees within the next 10 to 15 years.

This alternative would provide timber to the local wood products industry at lower levels than at present. The average annual timber harvest under this alternative would be 0.6 MMBF. This level of production would account for six jobs in the planning area. The annual revenue generated by this harvesting would amount to about $442,000. At an average stumpage value of $20 per MBF, the timber harvested would generate $12,000 per year to the United States government in timber sale receipts.

Consolidation of landownership on Elk Mountain and Shirley Mountain would have a long-term beneficial effect on the forest resource. Insect and disease control would be more effective. Forest management activities would not be constrained by ownership boundaries; therefore, each problem area would be treated as an entity and in a timely manner. This would greatly improve the degree of success for the particular control measure. The condition of the forest would improve in the long term.

Conclusion: Alternative B would provide an opportunity for improving the health and productivity of a small part of the forestland. Only 23% of the commercial forestland would be under some intensity of management over the next 100 years. The remaining 77% would continue to deteriorate over time, with increased levels of insects, disease, and stagnation. Wood products would be available to industry at lower levels than at present. Consolidation of landownership on Elk Mountain and Shirley Mountain would enhance the efficiency of insect and disease control measures in those areas.

Effects on Lands Program

Under Alternative B, no land would be identified for community expansion. Communities in the planning area that are partially or totally surrounded by public land would not have the opportunity to acquire public land for expansion or community services. Affected communities might have difficulty meeting such needs. Real estate prices in affected communities could rise as growth put pressure on a limited land base.

Avoidance areas for utility/transportation systems would be identified case by case. Such systems would be routed to avoid areas containing high-value or fragile cultural and natural history resources, watersheds and soils, visual resources, and wildlife habitat. Routing developments around such areas could force the use of longer, rougher routes, increasing project costs. It could necessitate the installation of facilities in less than ideal areas that are difficult to reclaim. Relatively small avoidance areas would not have as great an effect as larger ones, since small areas generally could be avoided easily. If an area could not be avoided, effects of facility development would have to be mitigated, and mitigation would add cost to the project. The amount of any increased cost cannot be determined at this time.

Effects on Livestock Grazing

Introduction

Under Alternative B, the vegetative resource would be managed to enhance wildlife, watershed, and riparian values. Vegetation management for livestock use would be considered only after demands for wildlife, watershed, and riparian values had been met. Vegetation condition would be improved through management on most allotments. New AMPs would be developed and projects implemented in support of those AMPs. (The Livestock Grazing appendix contains an explanation of the calculations used to arrive at estimated changes in AUMs.)

Under Alternative B, management actions for lands and minerals would slightly reduce available forage in the Divide and Seven Lakes EIS areas. The acreage disturbed and not reclaimed (and therefore the acreage taken out of forage production) would amount to approximately 11,299 acres (1,883 AUMs) over the next 20 years. This is less than 1% of the available AUMs in the Divide and Seven Lakes portion of the planning area, and the loss would be considered minimal.

Some individual livestock operations could be directly affected by a management action for lands or minerals. If sufficient acreage was removed from the grazing base in an individual allotment, the livestock operator in that allotment might be forced to rent private pasture or feed additional hay. The exact location and extent of future lands and minerals actions (and thus the effect on individual allotments) cannot be predicted.

No change in livestock grazing use would be proposed for the Medicine Bow grazing EIS area under this alternative. However, existing data were used to predict how future ecological condition changes, management actions for other programs, and livestock adjustments due to monitoring would affect the availability of forage. Livestock grazing use levels in the Medicine Bow grazing EIS area would decrease below the active preference level in the long term.

Management Actions for Forestry

The proposed clearcut harvest of 60 acres of sawtimber per year and the removal of 200 acres of noncommercial, nonproductive old age stands over the next 20 years would result in approximately 106 AUMs of additional forage available to be grazed by livestock in the long term. This is 10% of the total forage available to be grazed by livestock and wildlife from increased understory production due to harvest.

Management Actions for Lands and Minerals

The effects on livestock grazing from management actions for lands and minerals in the Medicine Bow grazing EIS area would amount to a loss of 2,436 acres (406 AUMs) from the public land grazing base in the next 20 years. Actions that would result in the above loss of available forage would be those for utility and transportation systems (970 acres, 162 AUMs), locatable minerals (500 acres, 83 AUMs), oil and gas development (966 acres, 161 AUMs), and coal development (all acreage disturbed would be reclaimed).

Management Actions for Livestock Grazing

Some of the grazing treatments in the Medicine Bow grazing EIS area would suspend livestock grazing on spring ranges (see the Livestock Grazing appendix). Implementing these treatments would result in an initial licensed use level of 134,026 AUMs, down from the present 161,464 AUMs.

The exclusion of livestock grazing from 13,140 acres of big game crucial winter range would make 2,190 AUMs of forage unavailable to livestock (see maps 58, 59, and 60).

The effects of implementation of 55 AMPs and construction of projects in support of these plans would provide an increase in AUMs in the long term. Grazing systems, an integral part of any AMP, might require greater stocking rates on smaller portions of the allotment. This increased utilization in the grazed area allows the ungrazed areas to rest while providing more even utilization of the vegetation in the grazed areas. The plants in the ungrazed areas are allowed to increase in vigor, storage, and reproduction, which leads to increased production the following year. These positive aspects of rest outweigh the increased utilization in the grazed years (USDA, SCS 1971; USDA, FS 1971).

On the basis of a review of grazing systems in the Western states by Van Poolen and Lacy (1979) and analysis of existing ecological conditions and trends by the planning area range staff, it is estimated that a 20% increase in AUMs would be realized through implementation of grazing systems and AMPs in the long term. The increase in the "I" category allotments is shown in table LVGR-AP-6 in the Livestock Grazing appendix.

The fences and water developments required in the implementation of grazing systems and AMPs would have an initial inconsequential impact on livestock grazing through loss of vegetation at the project site.

Burning or spraying of brush species would be designed to enhance productivity of the herbaceous vegetation. Approximately 43,700 acres on 43 allotments would be identified for this kind of treatment (see table LVGR-AP-4 in the Livestock Grazing appendix). Once established, brush species such as big sagebrush are very tenacious and long-lived. Uncontrolled competition from these brush species for water and nutrients reduces the productivity of the herbaceous plant species in the community.

The exact change in composition from sagebrush-grass to grasses and forbs after burning or spraying cannot be predicted because of variation in the range sites. However, spraying has reduced big sagebrush 67% to 100% in some areas (Blaisdell and Mueggeler 1956). Burning of sagebrush in one experiment produced a 90% increase in production of grasses and forbs (Pechanec, Stewart, and Blaisdell 1954). In a review of sagebrush spraying in Wyoming, Kearl (1986) found that forage production increased 167%.

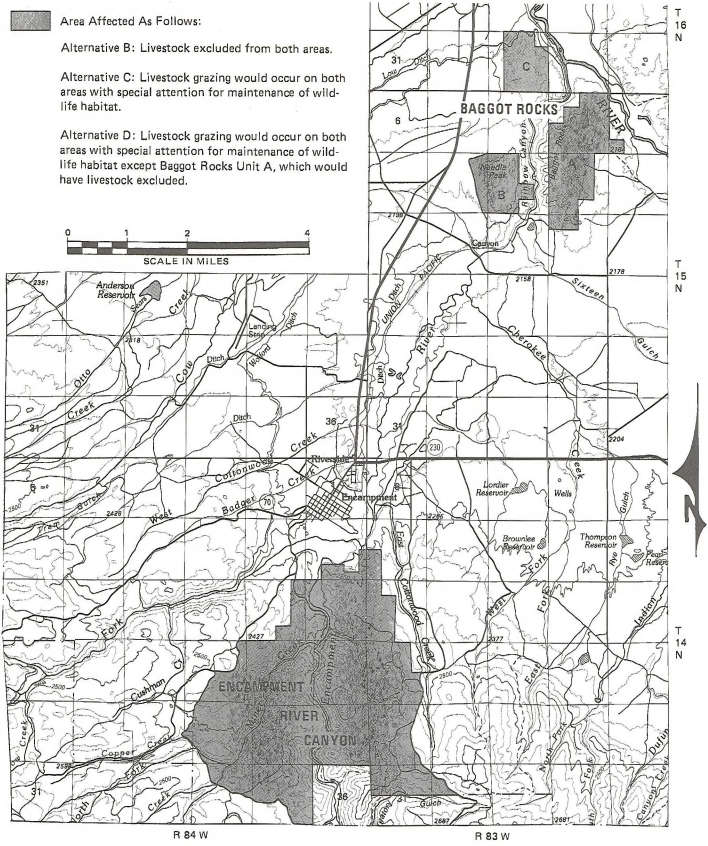
It has been assumed that a 100% increase in forage would be available as a result of burning or spraying. Only 10% of the additional forage

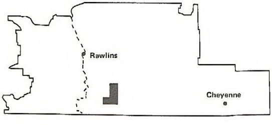
▨ Area Affected As Follows:

Alternative B: Livestock excluded from both areas.

Alternative C: Livestock grazing would occur on both areas with special attention for maintenance of wildlife habitat.

Alternative D: Livestock grazing would occur on both areas with special attention for maintenance of wildlife habitat except Baggot Rocks Unit A, which would have livestock excluded.

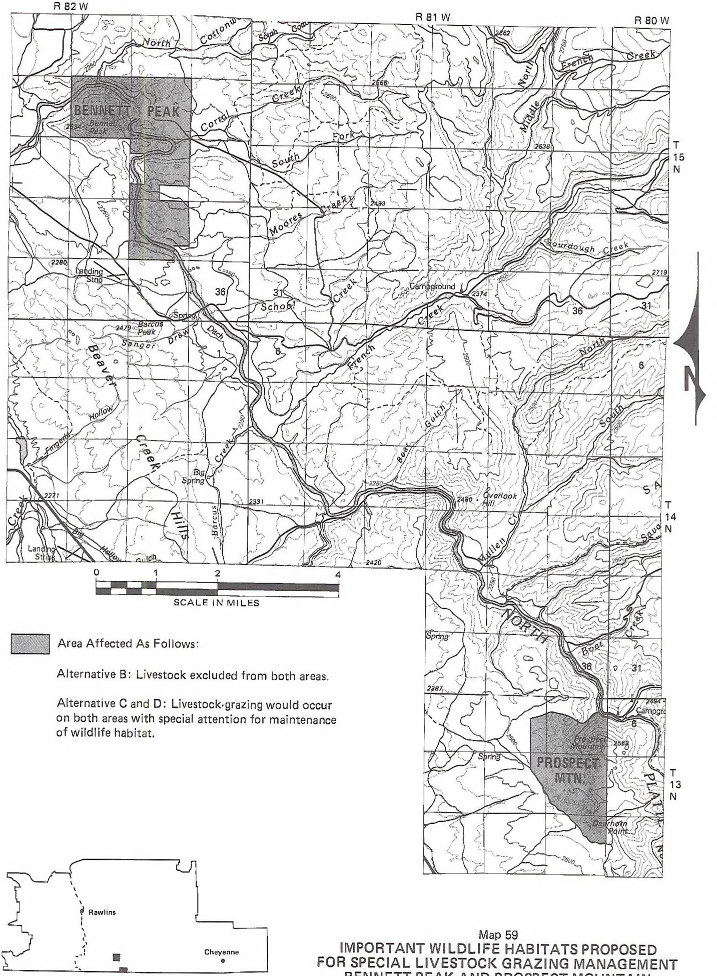




Map 58

IMPORTANT WILDLIFE HABITATS PROPOSED FOR SPECIAL LIVESTOCK GRAZING MANAGEMENT ENCAMPMENT RIVER CANYON

Medicine Bow-Divide Resource Management Plan



▨ Area Affected As Follows:

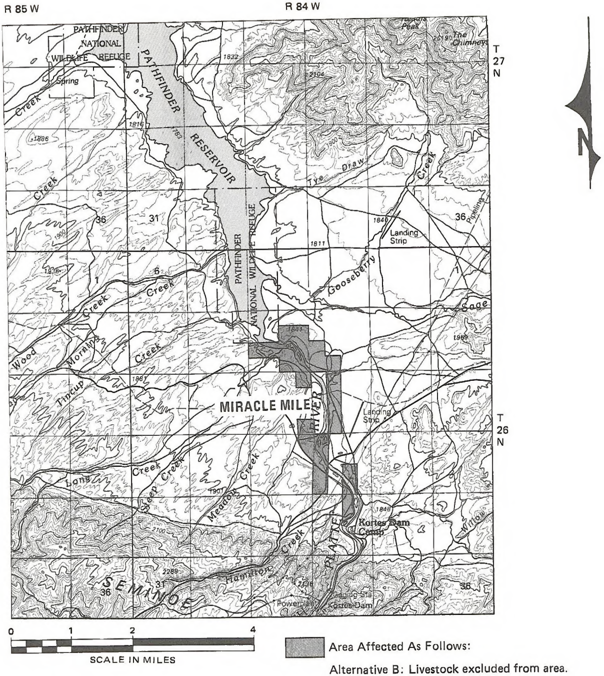
Alternative B: Livestock excluded from both areas.

Alternative C and D: Livestock-grazing would occur on both areas with special attention for maintenance of wildlife habitat.

Map 59

IMPORTANT WILDLIFE HABITATS PROPOSED FOR SPECIAL LIVESTOCK GRAZING MANAGEMENT BENNETT PEAK AND PROSPECT MOUNTAIN

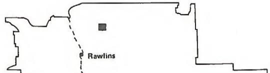
Medicine Bow-Divide Resource Management Plan



▨ Area Affected As Follows:

Alternative B: Livestock excluded from area.

Alternative C and D: Livestock grazing would occur on area with special attention for maintenance of wildlife habitat.



Map 60

IMPORTANT WILDLIFE HABITATS PROPOSED FOR SPECIAL LIVESTOCK GRAZING MANAGEMENT MIRACLE MILE

Medicine Bow-Divide Resource Management Plan

would be available to livestock under Alternative B; therefore, an additional 1,355 AUMs would be available for livestock grazing. The benefits to livestock grazing would be due primarily to reduced utilization and possibly to better distribution of livestock on other areas of individual allotments. Better forage condition and increased use of more desirable species in the burned or sprayed areas also would benefit livestock.

Vegetation in riparian areas would be improved through management, which would include fencing to exclude livestock grazing. Approximately 436 acres of riparian stream zones in "I" allotments would be managed to improve the areas to good or better condition. Once the acres were improved to good condition, they would be incorporated into the grazing systems for the allotment on a limited basis. The short-term result of this action would be elimination of approximately 218 AUMs of available forage for livestock. Some percentage of this total would be available in the long term through the AMP process. There would be an additional effect on the livestock operators through increased reliance on alternate forage sources, increased use of private pasture, or increased labor costs necessitated by more frequent herding or moving of livestock.

An additional total of 1,289 acres of riparian vegetation would be improved to good or better condition through the AMPs developed for the "I" allotments. The result of this action would be an increase in forage available for livestock grazing. The increase in available AUMs that would result from this action is included in the above total of increased AUMs from AMP development. This improvement would require a longer time to occur than the improvement due to fencing and the exclusion of grazing.

Existing data were used to predict future changes in ecological condition and livestock adjustments due to monitoring. As discussed in the analysis of the effects on vegetation for Alternative B, trends in ecological condition in the Medicine Bow grazing EIS area would be expected to improve in the long term under this alternative. However, exclusion of livestock from certain areas and allocation of only 10% of the total forage production increases to livestock would result in an overall decrease in forage available to livestock. Over the long term, the amount of forage available to livestock under this alternative would be reduced to 147,599 AUMs from the present 161,464 AUMs.

Conclusion: The long-term availability of forage for livestock grazing would be expected to decrease to 147,599 AUMs under Alternative B. Table LVGR-AP-6 in the Livestock Grazing appendix shows the estimated adjustment in authorized use, by allotment, that would result from management actions for livestock grazing in the long term.

Under Alternative B, available forage in the Medicine Bow grazing EIS area would decrease by 2,490 AUMs. This would result from management actions for lands, minerals, and forestry and from exclusion of livestock from crucial winter range for wildlife. Therefore, the long-term total amount of forage available for livestock would be 145,109 AUMs. This figure is 10% below the active preference level and 2% below the five-year average licensed use level. This means that this alternative would be expected to result in a reduction below the five-year average use level in the grazing EIS area.

Management actions of Alternative B for lands and minerals management would reduce available forage in the Divide and Seven Lakes EIS areas by less than 1% over the next 20 years.

Effects on Mineral Resources

Leasable Minerals—Coal

Under Alternative B, the coal available for further consideration for leasing would be the same as in Alternative A except that the North Indian Springs area, 3,840 acres containing 25 million tons of coal, would be added. Thus, the total amount of coal available for further consideration for leasing would be 53,620 acres containing 357.2 million tons of coal. This would improve the BLM's flexibility to respond to changes in demand as compared to Alternative A. However, the Northeast Cow Creek and Atlantic Rim areas, both of which have development potential, would not be available for leasing consideration.

Leasable Minerals—Oil and Gas

Management Actions for Minerals (Oil and Gas)

Effects of surface protection and seasonal stipulations were discussed under "Assumptions for Minerals." The magnitude of the effects is difficult to predict, but it generally would depend on the amount of acreage covered by restrictions. The acreages listed as affected by standard protection requirements in table 1 (chapter 2) are not additive because the areas overlap. However, the figures indicate that more acreage would be affected under Alternative B than under Alternative A (see table 30). Acreage covered by seasonal restrictions would be the same as under Alternative A at 1.4 million acres, or 28% of the federal mineral estate in the planning area.

Management Actions for Wildlife and Fisheries

A total of 37,560 acres would be closed to new leasing to protect wildlife and watershed values in Sand Hills, paleontological and historical values in Como Bluff, and raptor values in raptor concentration areas. This would eliminate oil and gas exploration and development on those areas.

Oil and gas exploration and development could be adversely affected by the management actions for the proposed ACECs on 79,700 acres of raptor concentration areas and 79,000 acres for elk crucial winter range. The resulting more intensive mitigation to protect higher priority resources would influence drill pad location. Limitations caused by more stringent stipulations could make impossible the most efficient field development. If federal minerals were drained by other operations, royalties would be lost. The mitigation of surface disturbance to restore or replace lost habitat could increase reclamation expenses to the extent that oil and gas development would be precluded.

Locatable Minerals

Management Actions for Minerals (Locatable Minerals)

Under Alternative B, 16,355 more acres would be proposed for withdrawal from mineral entry than under Alternative A, for a total of 919,355 acres. Impacts would be similar to those described for Alternative A, but on a larger area. Withdrawals have the long-term effect of precluding mineral development in potentially productive lands.

Management Actions for Wildlife and Fisheries

Under Alternative B, 79,700 acres of raptor concentration areas, 79,000 acres of elk crucial winter range, and the 12-acre pelican island would be designated as ACECs. Plans of operations would be required for all but casual use of mining claims in these areas. Approval of plans of operation can cause delays in mineral development.

Conclusion: The BLMs flexibility to respond to changes in the demand for coal would be better under Alternative B than under Alternative A, but two areas with development potential would not be available.

Surface protection restrictions would affect the availability of oil and gas on more lands than under present management. Seasonal restrictions would affect the availability of oil and gas in 28% of the planning area. Oil and gas exploration and development would be precluded on 37,560 acres that would be closed to leasing.

Management requirements on 158,712 acres designated as ACECs would affect mineral exploration and development. A total of 919,355 acres would be withdrawn from locatable mineral entry.

Effects on Recreation

Introduction

The availability of recreation opportunities under Alternative B would be greater than under Alternative A, and Alternative B would enhance recreation resources. Important recreation resources such as developed sites, proposed sites, and major segments of the North Platte River would be given maximum protection from surface-disturbing activities. Development of coal would not affect recreational resources under this alternative.

Management Actions for Livestock Grazing

Improvement of 85 miles of aquatic habitat under this alternative would enhance opportunities for fishing in small streams and beaver ponds.

Management Actions for Minerals

Leasable Minerals—Oil and Gas

Effects on recreation under this alternative would be similar to those described under Alternative A in that existing recreation sites would be protected from oil and gas activity, as would a corridor ¼ mile wide on either side of the North Platte River. In addition, proposed recreation sites—Jelm Mountain (10 acres), Prospect Creek (5 acres), Nine Mile Hill (40 acres), Battle Mountain (40 acres), and Shirley Mountain (20 acres)—would be protected from surface disturbance under Alternative B. Protection of these areas now would ensure that they would remain intact for future recreation site construction.

Locatable Minerals

More land would be withdrawn from mineral entry under Alternative B than under Alternative A. The additional land includes proposed recreation sites and important segments of the North Platte River that have high recreation value. Alternative B would protect important recreation resources from potential degradation caused by locatable mineral developments. Withdrawal of these areas from mineral entry would ensure long-term protection of the quality of recreation experiences in these areas.

Management Actions for Recreation

Effects on recreation from recreation management under Alternative B would be similar to those described for Alternative A. One difference is that ORV use would be limited to designated roads and trails in the Sand Hills management area. The primary recreation users of this area are deer hunters, and such an ORV limitation would require that they walk into areas where formerly they could drive. The greatest distance from any point in the area to a designated road is 1½ miles. Vehicle access to and through the area would still be available.

Recreation-related impacts due to consolidation of landownership under this alternative would be the same as those described for Alternative A except that more areas would be considered for consolidation in this alternative. This could increase opportunities for fishing and hunting more than in Alternative A.

Conclusion: Alternative B would enhance recreation resources. Areas with high recreational value (such as developed and proposed sites and major portions of the North Platte River) would be protected from surface disturbance caused by oil and gas activities and locatable mineral entry. More high-value recreation land would be consolidated under this alternative than under Alternative A. New recreation sites would be developed, and additional access into high-value recreation areas would be sought. This would increase recreation opportunities in the planning area.

Effects on Soils, Water, and Air

Introduction

Assumptions about impacts presented in this analysis are included in "Assumptions for Soils, Water, and Air."

Management Actions for Forestry

The effects of actions for forest management under Alternative B would be similar to those described for Alternative A, but on a different number of acres.

Under Alternative B, 15,622 acres (14% of the forestlands in the planning area) would be intensively managed for forest products. Proper timber harvest techniques would keep the short-term effects of accelerated erosion, local degradation of air quality, and degradation of water quality to a minimum. As in Alternative A, forest management in these areas should reduce accelerated erosion and improve or maintain water quality in the long term by ensuring good vegetative cover, but the acreage would be smaller under Alternative B.

Precommercial thinning would be carried out on about 450 acres in the next 20 years. About 200 acres of nonproductive, stagnated stands would be removed and replaced with new, vigorous trees. As in Alternative A, this would have a minimal short-term effect. It should reduce accelerated erosion and improve or maintain water quality in the long term, but on a smaller acreage than in Alternative A.

Removal of trees would have the effect of producing additional runoff, but the amount of runoff produced would be less overall than in Alternative A, since less acreage would be involved.

Harvest activities would be restricted on 624 acres (less than 1% of the forestlands) to protect soil and watershed values. Effects from this limited harvesting would be minimal because of the harvest restrictions.

Timber harvesting would be prohibited on 9,929 acres (9% of the forestlands). As discussed for Alternative A, this would prevent potential accelerated erosion, local degradation of air quality, and degradation of water quality in the short term, but on a larger acreage. In the long term, erosion could be increased and water quality degraded on the affected areas from a loss of vegetative cover through insects, disease, and fire. The effect of insect and disease losses would be expected to be minimal because vegetation loss would be gradual over time, with replacement by understory vegetation.

Management Actions for Livestock Grazing

Soil, water, and air resources would benefit under Alternative B from the development of new AMPs on "I" category allotments, planned range improvements, and elimination of livestock grazing during critical spring growth on all allotments where grazing now occurs prior to range readiness. Allotments in a downward trend would be improved. Vegetative cover generally would be increased as condition improved. This would lead to decreased rates of accelerated erosion. A reduction in accelerated erosion would enhance water quality by reducing salt and sediment loading.

Planned range improvements would be designed with full consideration of soil, water, and air resources. This would maintain and improve soil productivity and water quality. These improvements could reduce accelerated soil erosion and enhance water quality by controlling stream flows, making them less erosive and protecting streamside vegetation.

Livestock would be permanently excluded from 13,140 acres of important wildlife habitats. In addition, livestock would be temporarily excluded from 436 acres of riparian areas until condition improved sufficiently to allow limited seasonal grazing. In addition, 1,289 more acres of riparian areas would be improved through grazing systems. Vegetative cover should increase in some of these areas where accelerated erosion is not too far advanced. This would lead to decreased rates of erosion, which would enhance water quality by reducing salt and sediment loading.

Any changes in kind of livestock from sheep to cattle would be accompanied by appropriate management actions to maintain or improve riparian condition. This would improve stream bank stability, thereby reducing stream bank erosion and improving water quality.

Management Actions for Minerals

Leasable Minerals—Coal

In addition to the coal available for leasing consideration under Alternative A, 3,840 more acres would be available for consideration for leasing under Alternative B. This additional coal, which is in the North Indian Springs area, would be available for leasing consideration only for in situ development. In situ coal development affects soils, water, and air less than surface mining. Coal development is projected to disturb 4,000 acres over the next 20 years, regardless of the amount of coal available for leasing consideration. The effects of coal mining for Alternative B would be similar to those discussed under "Effects of Management Actions Common to All Alternatives."

Leasable Minerals—Oil and Gas

Surface disturbance from oil and gas exploration and development would be restricted on as much as 1,515,210 acres of steep slopes, riparian areas, perennial surface water, intermittent and ephemeral streams, historic trails, VRM Class I and II areas, recreation sites, sage grouse leks, and high priority wildlife habitat. Seasonal restrictions on surface disturbance from oil and gas exploration and development would be applied to 1.4 million acres. The effect on protection of soils and water and maintenance of air quality would be similar to that described for Alternative A, but on a larger acreage.

Restrictions on surface disturbance along intermittent and ephemeral streams would greatly enhance protection of soils and maintenance of water quality because these drainages can contribute sediment, salt, and other contaminants to perennial streams when they carry water, especially if they have been disturbed.

A total of 37,560 acres would be closed to oil and gas leasing. This includes the Sand Hills area, the Como Bluff area, and two raptor concentration areas. This would eliminate surface disturbance from oil and gas exploration and development, helping to protect soils and water and maintain air quality in those areas.

Locatable Minerals

Approximately 919,355 acres would be withdrawn from locatable mineral activities under this alternative. Effects would be similar to those discussed for Alternative A, but on a larger acreage. Withdrawal would prevent potential accelerated erosion and degradation of water and air quality that could result from these activities.

A total of 158,712 acres would be designated ACECs in this alternative, and plans of operations would be required for all but casual use on mining claims. This would provide for mitigation of effects on soils, water, and air quality from development of locatable minerals in the ACECs.

Management Actions for Wildlife and Fisheries

Management actions for wildlife under Alternative B would protect riparian areas, improve vegetative cover, and reduce surface disturbance on 864,975 acres and 45 miles of streams. As in Alternative A, this would benefit soil, water, and air resources by restricting surface disturbance and reducing the potential for resulting accelerated soil erosion, but on a larger acreage.

Conclusion: Many of the effects of Alternative B would be similar to those discussed for Alternative A, but the acreage affected would be different. Intensive forest management on 15,622 acres (14% of the forestlands) would lead to minor acceleration of soil erosion, local degradation of air quality, and degradation of water quality, but proper timber harvest techniques would keep these effects to a minimum. In the long term, forest management could help ensure good vegetative cover, which would reduce accelerated erosion and improve water quality.

Restricted harvest on 624 acres (less than 1% of the forestlands) would have minimal effects. On 9,929 acres (9% of the forestlands) where harvesting would be prohibited, the decline in health and vigor of the forest could increase erosion and degrade water quality in the long term if wildfire occurred.

Improvement in trend and vegetative cover in "I" category allotments would lead to decreased rates of accelerated erosion. A reduction in accelerated erosion would enhance water quality by reducing salt and sediment loading.

Improvement of 13,140 acres of important wildlife habitats and 1,781 acres of riparian areas through grazing management actions would increase vegetative cover and lead to decreased rates of accelerated erosion. This would enhance water quality by reducing salt and sediment loading. Management actions to maintain or improve riparian condition that would accompany changes in kind of livestock from sheep to cattle would improve stream bank stability, reduce stream bank erosion, and improve water quality.

Water and air quality would be maintained and unacceptable rates of accelerated erosion would be prevented in areas protected by surface disturbance restrictions (1,515,210 acres), seasonal restrictions on oil and gas exploration and development (1.4 million acres), and closure to oil and gas leasing (37,560 acres). Restrictions on surface disturbance along intermittent and ephemeral streams would greatly enhance protection and maintenance of soils and water quality.

Withdrawal of 919,355 acres from locatable mineral entry would help to prevent potential accelerated erosion and degradation of water and air quality. Requirements for plans of operations for all mining activity but casual use on 158,712 acres designated ACECs would protect soils and water and maintain air quality.

Management actions for wildlife to protect riparian areas, improve vegetative cover, and reduce surface disturbance on 865,020 acres would restrict surface disturbance and reduce the potential for resulting accelerated soil erosion.

Under Alternative B, 3,840 more acres than under Alternative A would be available for consideration for leasing (for in situ coal development only). The effects would be similar to those discussed under "Effects of Management Actions Common to All Alternatives." Coal mining and some locatable mineral mining have a higher potential to cause unacceptable rates of accelerated erosion on specific sites than other anticipated activities. Those activities also have a high potential to affect water and air quality.

As in all alternatives, installation of utility and transportation systems and other facilities would increase soil erosion, increase sedimentation during construction, and increase dust particulates in the air. Management actions for soils, water, and air in the Muddy Creek, Sage Creek, and Second and Third Sand Creeks watersheds would minimize potential soil compaction, removal of vegetative cover, sedimentation of streams, degradation of air quality, accelerated erosion, and contamination of groundwater in those areas.

Effects on Vegetation

Rangeland Vegetation

As discussed under "Assumptions for Vegetation," actions for livestock grazing and wildlife are the only actions that would have a material effect on the condition and trend of rangeland vegetation.

Under Alternative B, vegetation would be managed to enhance wildlife habitat, watershed, and riparian areas. Vegetation management for forage production for livestock use would be considered only after demands for wildlife, watershed, and riparian values had been met. Ecological condition and vegetation trend would improve in the Medicine Bow grazing EIS area under this alternative.

Alternative B would result in an overall improvement of 8.5% in ecological condition in the grazing EIS area in the long term. Changes in long-term condition and trend would be brought about by both short-term and long-term management actions. Long-term improvements in ecological condition and vegetation trend that would result from the management actions for the grazing EIS area are discussed below and are shown by allotment in table LVGR-AP-6 in the Livestock Grazing appendix.

Current levels of livestock grazing use would be continued until monitoring data could be collected. This would mean that management actions on "I" category allotments would be deferred in the short term. In areas where the present management is considered unacceptable, problems such as improper distribution of livestock would continue. During the short term, while monitoring was being initiated, the vegetative vigor, vegetative production, seed production, and seedling establishment would continue in the present trend. Areas with declining trend would continue a downward trend, while areas with static or upward trend would continue in their respective directions.

Management actions that would be implemented before collection of monitoring data could include allotment boundary fences, development of additional water sources, or prescribed burns or sprays. These actions all could be developed before monitoring in the hope of reversing declining trends or improving stagnant, decadent vegetative communities.

Ecological condition would benefit in the long term under this alternative. These benefits would result from adjustments in grazing use that could be made after monitoring to achieve sustained-yield utilization levels. Such adjustments could stabilize areas with a downward trend.

The effect of eliminating livestock grazing on 13,140 acres of big game crucial winter ranges and other important habitats would vary, depending on (a) the characteristics of the critical area, (b) the length of time the closure would be enforced, and (c) the intensity of the livestock grazing pressure before the closure. An area in an upland position that exhibits a reduced species composition and decreased vigor, seed production, and seedling establishment could require five or more years after closure to respond if precipitation is low.

In areas where the influence of water is strong, such as wet meadows that have been subjected to excessive grazing pressure by livestock, the elimination of livestock grazing for even a period as short as two to three years would improve the production, vigor, seed production, and seedling establishment of the available species. Once these areas had responded to rest, livestock grazing could be allowed on a limited basis.

It has been shown that livestock can use mule deer and antelope winter ranges in spring and early summer without greatly affecting subsequent production of shrubs, because at this season livestock subsist primarily upon herbaceous forage. The use of shrubs may be compensated for by increased browse production resulting from reduced competition from herbaceous plants (Stoddart, Smith, and Box 1975). For example, a 40% to 60% increase in twig growth on bitterbrush resulted from continuous summertime clipping of herbaceous plants that were adjacent to bitterbrush plants (Smith and Doell 1968).

Initially licensing livestock use at 134,026 AUMs through implementation of grazing treatments (see the Livestock Grazing appendix) would suspend livestock grazing on spring ranges. The effects of spring rest would benefit all allotments on which grazing treatments include deferred spring grazing, as discussed below. Vegetation condition and trend would continue as before on "C" or "M" allotments on which spring deferment was not required.

All "I" category allotment seasons of use would be adjusted through the development of AMPs. The delay in grazing would give management species the opportunity to flower and build up carbohydrate reserves before being weakened by grazing (Blaisdell and Pechanec 1949; Britton, Sneva, and Clark 1979) Later turnout dates would meet the physiological requirements of management species by providing the rest and uninhibited growth required to increase growth, vigor, and seedling establishment, thereby improving ecological condition and vegetation trend.

Areas that are currently subject to excessive grazing pressure by all herbivores (such as the wet meadow vegetation subtype) would show the greatest improvement in the shortest time. Vegetation in upland areas (grass, sagebrush, mountain shrub, and juniper vegetation types) would improve, but at a much slower rate than vegetation in areas influenced by abundant water. Spring deferment would have an important beneficial effect on ecological condition and vegetation trend.

Implementation of 55 AMPs in the long term and construction of projects in support of the AMPs would improve ecological condition in these allotments by allowing most plants to complete growth cycles and increase carbohydrate reserves (see table LVGR-AP-6 in the Livestock Grazing appendix) . This would benefit ecological condition and vegetation trend. All riparian vegetation in the "I" category allotments would be expected to improve in condition as a result of these AMPs.

One of the main objectives of implementing AMPs is to increase available forage while improving vegetation condition and trend. Condition would be enhanced by improving ground cover, species composition, plant vigor, and density (Stoddart and Smith 1955). The rate of change in condition would vary, depending upon site potential, present vegetation condition, present cover, natural seed sources, extent of range improvements, and climatic conditions (Stoddart and Smith 1955).

The physiological needs of management species would be met through implementation of the proposed AMPs and rangeland projects. The past practice of season-long grazing would be eliminated as grazing systems were implemented. Rest-rotation systems would promote vigor and seedling success of forage species by rest and deferment, promote seed planting of forage species by the mechanical action of animal movement following deferment, reduce ill effects of repeated overuse of preferred areas that commonly occur with continuous grazing, and increase animal productivity as a consequence of increasing vegetation productivity (Hanley 1979).

Water developments and fencing (see the Livestock Grazing appendix) would improve the distribution of livestock. Proper distribution of livestock is essential to effective use of the range (Cook 1967). As discussed above, uniform utilization of the range and rest during critical periods of growth can reduce the ill effects on forage plants from overgrazing and continuous season-long grazing. Improved livestock distribution would benefit ecological condition and vegetation trend.

Vegetation would be manipulated on 43,745 acres in the Medicine Bow grazing EIS area to obtain a desirable vegetation composition or to correct a range suitability problem such as lack of production. Vegetation manipulation could be conducted by burning or spraying, possibly followed by seeding. Most of the manipulation (95%) would involve eradication of sagebrush within the sagebrush vegetation type. The majority of the sagebrush control in the past 85 years has been by burning and spraying. Shrubs that do not sprout from the root, such as big sagebrush, sometimes can be completely eradicated by a single fire when there is adequate ground fuel or dry grass to carry the fire.

The response of the herbaceous vegetation after a fire depends on the type of herbaceous vegetation present before the fire, the intensity or temperature of the fire at ground level, the season of burning, and the phenological stage of growth at the time of burning. Significant increases in the production of the herbaceous species have been observed following wildfires within the grazing EIS area. Even though there have been no studies in the planning area to quantify the amount of increase of herbaceous species, estimates of 75% to 100% would be considered realistic.

Results of previous sagebrush eradication by spraying in the planning area have indicated up to 85% removal of big sagebrush, accompanied by an increase in the production of the herbaceous species. Increases in production of the herbaceous species can be attributed to the opening of the canopy and the availability of increased moisture (Stoddart, Smith, and Box 1975).

The increased production in the areas treated by vegetation manipulation would allow increased use by grazing animals. This would allow other heavily utilized areas to rest. Thus, the benefits to the vegetative community as a whole from vegetation manipulation would be derived mainly from reduced utilization levels on untreated areas.

Riparian Vegetation

A plan to protect and improve streams and critical riparian areas through fencing would improve the vegetation by increasing productivity, vigor, and seed production in the short and long terms. Approximately 436 acres of riparian vegetation would be improved by exclusion of livestock grazing. Intensive management would increase the number of woody plants, improve stream bank condition, and increase the overall productivity of these sites.

Studies by Dahlem (1979) and Duff (1979) have shown that exclusion of livestock from riparian areas can result in noticeable improvement in riparian vegetation in a short time. As little as three to five years of exclusion may be all that is necessary for woody vegetation to reach heights that would adequately protect it from grazing and provide adequate stream bank cover and protection. These subirrigated sites would respond rapidly because of the large amount of moisture available. Once these areas improved, infrequent livestock grazing might be allowed so long as the riparian areas remained in good condition.

Existing riparian vegetation would be improved and new riparian vegetation could be created by the construction of reservoir fences to exclude livestock and piping of water to a trough outside the fence. Approximately 56 acres surrounding existing reservoirs could be improved in this manner, and approximately 84 acres of new riparian vegetation could be created around new reservoirs proposed under this alternative. The actual percentage of this area that would support riparian vegetation would depend on the fluctuation in water level in the reservoirs and on the characteristics of the soils and vegetation at each reservoir site. Any increase in riparian vegetation or improvement in existing riparian vegetation would benefit the vegetation resource.

Rare Plants

As in Alternative A, no effects on Gibben's beardtongue would be expected because the known population is fenced and a trend study is in place.

No effects on the population of persistent sepal yellowcress would be expected because of the BLM's efforts to coordinate with the Bureau of Reclamation on monitoring the population. The BLM also would coordinate with county weed and pest control districts on weed control proposals.

The Muddy Gap cushion plant community could possibly be affected by surface disturbance from ORV use, but the effect would not be likely to occur. Since the area would be withdrawn from mineral location, the community could not be disturbed by exploration and development of limestone deposits. The plant community would be monitored, and additional protective measures would be taken if monitoring indicated a need. This would help to ensure continued protection of the community.

Conclusion: Under Alternative B, the ecological condition and vegetation trend would be expected to improve over the grazing EIS area as a whole. Table LVGR-AP-6 in the Livestock Grazing appendix shows the estimated change in ecological condition by allotment that would result from all the management actions discussed above. The improvement in ecological condition over the grazing EIS area as a whole would be 8.5%.

A total of 1,781 acres of riparian vegetation would be improved through intensive management practices under this alternative. This is 46% of approximately 3,911 acres of riparian vegetation in the Medicine Bow grazing EIS area. Adverse effects on rare plants would not be expected to occur.

Effects on Visual Resources

As in Alternative A, the goal of visual resource management under Alternative B would be to minimize adverse impacts on visual resources while maintaining the effectiveness of land-use allocations.

Surface disturbance from oil and gas activity would be restricted on 194,000 acres of VRM Class I and II areas under Alternative B. These are areas of high scenic values upon which development activity could have the most adverse impacts. Limitations on surface disturbance would help to preserve visual quality.

Effects on Wildlife and Fisheries

Introduction

The goal of the wildlife program under Alternative B would be to continue present management practices under modified land-use plans that would emphasize greater protection of wildlife and fisheries resources. Increased spatial and temporal restrictions would be placed on activities that would have adverse effects on featured wildlife species and important habitat values such as crucial winter ranges and raptor concentration areas.

Typical impacts on wildlife from various types of activities are described in the Wildlife appendix.

Management Actions for Forestry

Under Alternative B, the level of timber harvest would decrease to an average of 600 acres per decade. This would be accomplished through the elimination of all harvest units except Shirley Mountain and Elk Mountain. Harvesting would not occur on Elk Mountain until the next decade. Effects on wildlife and fisheries would be similar to those described for Alternative A except for the following additional effects.

Elimination of the remaining harvest units (forest fringe, Laramie Peak, and Jelm Mountain) would provide short-term benefits for elk, deer, and other wildlife species through habitat maintenance. In the forest fringe areas, maintenance of forest stringer habitat (which provides edge, cover, and migrational corridors between winter and summer ranges) would benefit elk, deer, and other wildlife species.

In the long term, without harvest, these forest fringe habitats would be lost through extensive beetle kill. Not only would their value as edge habitat and migrational corridors be lost, but the opportunity to increase forest habitat diversity through scheduled harvest also would be lost. This would be a long-term adverse effect on elk, deer, and other wildlife species. Large expanses of beetle-killed timber could be expected to reduce wildlife use of the area.

Management Actions for Livestock Grazing

The short-term benefits for the wildlife community would be limited because of the monitoring period that would be required to determine current range conditions. Initiation of intensive management actions would lead to earlier benefits where problems are known to exist—for example, severely degraded riparian areas; areas where there is competition for forage between livestock and big game; or crucial winter ranges with interspecific competition among elk, mule deer, and bighorn sheep.

The long-term effects would be related to the overall improvement of the vegetative community, which would allow it to support a larger and more diverse wildlife community. Grazing systems, grazing treatments, range improvements, and cultural (vegetative) practices would be designed and utilized for the enhancement of the wildlife community as a whole. Standard habitat types, including riparian types, that are important to the wildlife community would receive accelerated management and would show rapid improvement.

Areas with high priority standard habitat types (including riparian types—see table 23 in chapter 3) would be the focal areas for management within an allotment. Grazing practices could be designed for the long-term improvement of such areas. In addition, there would be an associated increase in species abundance and diversity within the associated wildlife community. Where specific conflicts between livestock grazing and one or more featured wildlife species were identified, the livestock grazing would be altered to produce a beneficial effect for the featured species and total wildlife community.

With the exception of the Baggs elk herd, the population objectives established by the WGFD are considered to be below the wildlife grazing capacity. However, because of the potential adverse impacts on private and state lands within a herd unit, the population objectives would be maintained, since they are based on concerns of users and landowners as well as on the overall grazing capacity. As a result, there would be no population increases above the big game herd unit objectives and no improvement in the economic benefit from wildlife. However, if crucial big game ranges were improved significantly for the benefit of these species, large population losses might be minimized in severe winters because of improved forage availability and condition.

The nongame wildlife populations would be the main beneficiaries of the alternative. The increased vegetative structure, cover, and forage would permit larger and more diverse populations of the nongame portion of the wildlife community. There also would be beneficial effects on upland game birds and waterfowl; however, only minimal increases in their populations would be expected.

For a discussion of the fisheries variables and assumptions used in this analysis, see the "Assumptions" section earlier in this chapter.

Under Alternative B, approximately 41.5 miles of trout stream in the portion of the planning area not covered by the Divide and Seven Lakes RPSs (USDI, BLM 1984a, 1983d) would be included in "I" category allotments. AMPs would be developed, and stream maintenance and improvement objectives would be included in these plans. There is also good potential in this area for development of reservoirs of sufficient size to support stocked trout. Changes in kind of livestock from sheep to cattle would be monitored and actions taken to maintain trout stream habitat.

In the area covered by the Divide RPS (there are no trout streams in the Seven Lakes area), some positive effects on up to 43.5 miles of trout stream habitat in "I" allotments would result from AMPs. There would be some negative effects in allotments converting to all cattle, and in this area large new reservoirs would be unlikely.

Management Actions for Minerals

Leasable Minerals—Coal

Impacts on wildlife from coal activity under Alternative B would be the same as the described for Alternative A with the addition of the North Indian Springs area, which is analyzed as follows.

Most of the public land in the North Indian Springs area falls into the moderate priority habitat category. Vegetation communities on BLM-managed public land in the area are sagebrush/mixed grass steppe, big sagebrush/rabbitbrush steppe, saltbush steppe, badland, and rockland.

Under a current proposal, the Indian Springs underground coal gasification project (in situ operation) would be limited to approximately 1 mile of private land during the next ten years. Previous small-scale operations have had few impacts on wildlife, and few impacts would be expected from the expanded experimental operations over the next ten years.

Depending on the feasibility results of the ten-year project, full-scale commercial operations could take place over the subsequent ten years. Production would be expanded northward through a major portion of the Shamrock Hills raptor concentration area. An undetermined amount of public land would be involved in the project. There are 6,340 acres of public land within the boundaries of the coal area. Surface disturbance would include a paved road and pipelines that would run northward along the coal seam through the raptor concentration area. Three to four injection/production modules would be operating at any one time; they would be moved northward along the coal seam as extractable coal was exhausted. In addition, there would be a production processing facility for the modules and a commercial manufacturing facility.

In the short term, adverse impacts on raptor production probably would be kept below a detrimental level by adherence to the committed mitigation that was arrived at through the review of the coal unsuitability criteria. The objective of this committed mitigation is to maintain productivity of raptors within the Shamrock Hills raptor concentration area.

Noise and human presence in the area would be expected to have the most consequential adverse effects on nesting raptors. Over the short term, with adherence to the committed mitigative measures, the adverse effects would be localized and minor.

In the long term, the cumulative adverse effects of surface disturbance, noise, and human presence might reach a level that would jeopardize the integrity of the raptor concentration area. This could possibly result in reduced productivity—the results of such disruption are debatable. It is questionable whether the committed mitigative measures are adequate to achieve the objective of maintaining raptor productivity in the raptor concentration area. Data are insufficient to assess the cumulative effects of this project on raptors effectively and confidently.

Leasable Minerals—Oil and Gas

Management actions for the oil and gas program under Alternative B would be the same as those of Alternative A, but additional protection would be provided for important wildlife habitat. This would be accomplished through closure of such areas to leasing, or through management of developments, facilities, and activities both temporally and spatially to provide protection at certain times and in certain areas. These additional protective measures are described below.

Effects on wildlife from oil and gas activity under Alternative B would be similar to those described for Alternative A, with the following exceptions.

A total of 79,700 acres comprising ten raptor concentration areas would be designated as ACECs to focus management toward the maintenance of these important nesting areas (see map 61). Two of these raptor concentration areas, Shamrock Hills and Seminoe (27,500 acres), would be closed to oil and gas leasing. Spatial and temporal management of disturbance would be applied to the other eight raptor concentration areas to maintain their value to nesting raptors. Four other raptor concentration areas would continue to be protected by seasonal stipulations.

Closure of the raptor concentration areas to oil and gas leasing or leasing with surface protection and activity restrictions would provide long-term protection for nesting raptors. Stress, disturbance, and displacement would be avoided, so that normal productivity would be maintained and the physical integrity of the raptor concentration areas would be preserved. Raptors nesting in the four raptor concentration areas that would not be designated as ACECs would continue to be protected seasonally, and productivity would be maintained so long as the physical integrity of the raptor concentration areas was maintained.

The Baggs elk crucial winter range (see ACEC folded map) would be designated as an ACEC, and disturbance would be spatially and temporally managed to minimize habitat disruption and disturbance of the elk herd. This action would minimize habitat loss, stress, disturbance, and displacement. Mule deer and other wildlife species also would benefit, since there is some overlap in the elk and deer ranges. Actions on other big game crucial winter ranges would continue to be seasonally restricted, and this would protect big game from the effects of stress, disturbance, and displacement caused by development and exploration activities during critical periods. Long-term adverse impacts on big game winter ranges caused by surface disturbance would be further reduced, since mitigation to restore and/or replace lost habitat would be intensified.

Intensive spatial management would be applied to 122,000 additional acres of high priority wildlife habitat in the Medicine Bow Resource Area. This would minimize losses of high-value habitat for big game, game birds, beaver, waterfowl, and a variety of other wildlife species.

The 8,300-acre Sand Hills area would be closed to oil and gas leasing. The prevention of energy-related surface disturbance and human activity would reduce adverse effects in the long term for elk and mule deer That use the area for crucial winter range. Sage grouse utilizing the area for breeding and nesting habitat also would benefit from closure of this area. Wildlife species in general would benefit from the protection afforded wetland and riparian areas scattered throughout the area.

Impacts on all other areas open to oil and gas development would be the same as those described for Alternative A.

Locatable Minerals

Under Alternative B, impacts on wildlife from locatable mineral entry would be the same as those described for Alternative A. Effects that would be expected from additional withdrawals and ACEC designations are described below.

Withdrawal of the Como Bluff area for the protection of cultural resource values would maintain habitat integrity for antelope on 1,760 acres of crucial winter range.

Withdrawal from mineral entry of 11,000 acres of historic trail buffer zones could have some positive effects on wildlife species; however, because of the linear configuration of the withdrawn area, benefits would be important only where the withdrawn area coincided with wildlife travel lanes or migration corridors. In such areas, the withdrawal from mineral entry would maintain the integrity of those travel lanes or migration corridors.

Of the remaining 2,635 acres of additional withdrawals, 2,415 are associated with recreation sites. Any positive effects afforded wildlife through the maintenance of habitat probably would be negated in most cases by increases in human recreational activity.

Plans of operations would be required on 79,700 acres of raptor nesting habitat (ACECs) in ten raptor concentration areas (see map 61). Adverse effects on the integrity of raptor nesting habitat could be minimized, as could disturbance of nesting raptor pairs. Similar effects also could be afforded to elk on the 79,000-acre Baggs elk crucial winter range ACEC (see ACEC folded map) and to pelicans on the 12-acre pelican island ACEC, where plans of operation also would be required.

Management Actions for Recreation

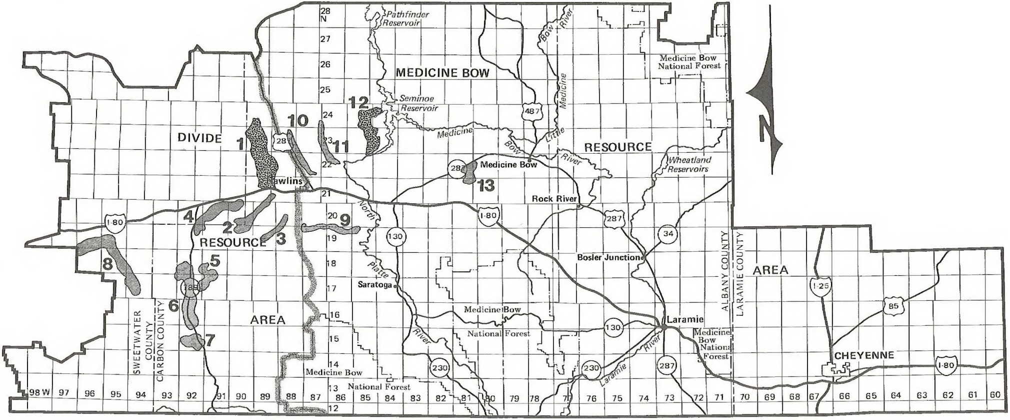
Under Alternative B, impacts on wildlife and habitat from ORV use would be the same as those of Alternative A except in the Sand Hills area. ORV management would restrict use to designated roads and trails in the Sand Hills, which would result in positive effects on wildlife, especially elk and mule deer on crucial winter range. Stress and disturbance during the critical winter period would be reduced, as would the disruption of travel corridors and migration routes, particularly as they relate to elk. Physical habitat loss would be stopped, and the potential for a significant loss of habitat through establishment of avoidance zones would be nullified.

The Sand Hills wildlife resource also would benefit from the habitat improvement that would result from the natural reclamation of nondesignated roads and trails. The positive effects discussed above would be further enhanced over the long term by the management action for oil and gas that would close the area to leasing.

Management Actions for Wildlife and Fisheries

Management of fish and wildlife under Alternative B would be similar to that described for Alternative A, with the following exceptions.

A total of 122,000 additional acres of high priority wildlife habitat in the Medicine Bow Resource Area would receive special emphasis



░ Protective Stipulations/ACEC

▩ Closed/ACEC

▓ Seasonal

1	Shamrock Hills	7	Blue Gap
2	Red Rim	8	Delaney Rim
3	Atlantic Rim	9	Bolten Rim
4	Cherokee	10	Brown Canyon Rim
5	Doty Mountain	11	Platte Divide
6	Muddy Creek	12	Seminoe
13	Hanna		

0 10 20 30 40 50
Scale In Miles

Map 61

RAPTOR CONCENTRATION AREAS
ALTERNATIVE B PROTECTIVE STIPULATIONS

Medicine Bow-Divide Resource Management Plan

for maintenance or improvement. This would minimize losses or degradation of high-value habitat for a wide variety of game and nongame species. Ten raptor concentration areas comprising 79,700 acres of public land (see map 61) would receive additional management emphasis through designation as ACECs. Two of these areas (27,500 acres) would be closed to oil and gas leasing. In the remaining 52,200 acres of ACECs, surface disturbance and human activity would be managed spatially and temporally (see the Wildlife appendix). These actions would maintain habitat integrity and reduce stress, disturbance, and displacement so that raptor reproduction could be maintained.

The Baggs elk crucial winter range would receive additional management emphasis through designation as an ACEC with spatial and temporal management of disturbance to maintain the integrity of the crucial winter range and survival of the elk herd. On 271,500 additional acres of big game crucial winter range, surface disturbance would be intensively mitigated to restore and/or replace lost habitat. This would reduce long-term adverse effects on big game species.

The Sand Hills area would be closed to oil and gas leasing, and ORV use would be restricted to designated roads and trails. This would result in positive effects on a wide variety of species, including elk and mule deer on crucial winter range. Degradation of this fragile and unique ecosystem would be avoided.

The proposed Dune Ponds cooperative management area would receive special management attention, with emphasis on riparian, aquatic, and waterfowl nesting habitat improvement, while the needs of ORV users would be provided for. Long-term benefits would be realized by fisheries, waterfowl, and a variety of other wildlife species through reduced disturbance and habitat improvement.

The 12-acre white pelican colonial nesting island would be designated an ACEC under Alternative B. The BLM would cooperate with the BuRec and the WGFD to implement actions that would protect the colony and its habitat from disturbance. This would help ensure the continued viability of the nesting colony.

Conclusion: Forestry actions under Alternative B would have some beneficial and some adverse effects on wildlife and fisheries. Surface disturbance and human activity would cause short-term adverse impacts on elk, mule deer, and other wildlife species. Elimination of harvesting in the forest fringe areas would benefit elk, mule deer, and other species in the short term because forest stringer habitat would be maintained. However, over the long term these forest fringe habitats would be lost to extensive beetle kill. There would be long-term adverse effects on elk, mule deer, and other wildlife from loss of habitat and lost opportunities to increase forest habitat diversity through scheduled harvest.

Except in obvious problem areas, short-term benefits for wildlife from livestock grazing management actions would be limited because of the monitoring period required before management actions could be initiated. A variety of wildlife species would receive long-term benefits from grazing systems, grazing treatments, range improvements, and cultural (vegetative) practices designed to enhance the wildlife community as a whole. Species abundance and diversity within affected wildlife communities would be increased through improvement of the vegetative community.

Improvements in big game ranges could minimize big game population losses in severe winters because forage availability and condition would be improved. Nongame wildlife populations would be the main beneficiaries under this alternative.

Alternative B would have positive effects on fisheries through addition of a few large reservoirs and through implementation of intensified management in "I" category allotments affecting up to 85 miles of trout stream. No negative effects would result from changes in kind of livestock in the grazing EIS area, but there probably would be some effects elsewhere in the planning area. The overall effect on fisheries in the entire planning area would be positive.

ACEC designation with intensive management of surface-disturbing activities, including spatial and temporal management or closure to leasing, would protect nesting raptor populations in ten raptor concentration areas. This management action also would favorably affect elk in the Baggs elk crucial winter range. Mule deer, sage grouse, waterfowl, beaver, and other wildlife species also would benefit from these actions.

High priority (high value) habitat for a wide variety of wildlife species would be maintained because 122,000 additional acres of high priority habitat in the Medicine Bow Resource Area would be brought under intensive spatial management.

Closure of the Sand Hills area to oil and gas leasing would reduce adverse effects on mule deer and elk through reduced surface disturbance and human activity on crucial winter range.

Withdrawal of the Como Bluff area from mineral entry would protect antelope crucial winter range from potential disruption by mineral activity. Under ACEC designations, plans of operation would be required on white pelican nesting habitat (12 acres), raptor nesting habitat (79,700 acres), and crucial winter range for elk (79,000). This would minimize adverse effects by maintaining habitat integrity and minimizing disturbance.

Management actions for wildlife and fisheries would benefit fish and wildlife in all HMP and special management areas.

ORV travel would be restricted to designated roads and trails in the Sand Hills area. This would provide positive effects on elk, mule deer, sage grouse, and a variety of other wildlife species. Cumulative benefits would be afforded wildlife in the Sand Hills area from the combination of restrictions on ORV use and closure of the area to oil and gas leasing. Physiological disturbance of elk, mule deer, and other species would be minimized, and natural reclamation of roads would result in improved habitat condition.

The continued viability of the nesting colony of white pelicans would be greatly enhanced under this alternative.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE C

Introduction

Under Alternative C, resource conflicts that occur under existing management would be resolved through intensive management of all resources. Attempts would be made either to mitigate impacts caused by surface-disturbing activities or to enhance a resource while maintaining other resource values.

The analysis of environmental consequences of Alternative C was based on the anticipated levels of resource use or development. Some of these uses or developments are not management plans or proposals and are not listed as such in table 1 in chapter 2. Rather, they represent feasible activities that could be expected to result from the management actions that would be carried out under this alternative. These uses or developments generally are dependent on market conditions beyond BLM control.

Anticipated Developments

Surface disturbance would be reclaimed as described under "Assumptions" at the beginning of this chapter. The assumed levels of development that were used in the analysis of Alternative C are presented here to give the reader a more complete understanding of the analysis. The following levels are projected for a 20-year period:

Clearcutting-4,000 acres (average of 200 acres per year)

Temporary logging roads-40 miles (average of 2 miles per year)

Land disposal-10,000 acres (average of 500 acres per year)

Surface disturbance from the following activities at the rates shown:

- Utility and transportation system development and maintenance-5,030 acres (average of 251.5 acres per year)
- Coal mining-4,000 acres (average of 200 acres per year)
- Oil and gas development-34,355 acres (average of 1,717.75 acres per year)
- Uranium mining-1,500 acres (average of 75 acres per year)

Effects on Cultural Resources/Natural History

Introduction

The assumptions about the effects of surface disturbance on cultural resources/natural history are discussed in the "Assumptions" section of this chapter.

Management Actions for Cultural Resources/Natural History

Under Alternative C, the Como Bluff NNL would be designated an ACEC. The management emphasis afforded by the designation would help ensure the protection of cultural, natural history, and paleontological resources in the area.

Consideration would be given to transferring from federal ownership 160 acres in the proposed Gangplank NNL, 640 acres in the Big Hollow NNL, and 160 acres in the Sand Creek NNL. The areas would be considered for transfer to individuals, organizations, agencies, or institutions that would manage the areas in accordance with their NNL status. This could enhance management of the natural history values in the areas because the effectiveness of current BLM management is limited by lack of legal access to the relatively small public land parcels in areas that are predominantly in other ownerships.

Management Actions Involving Surface Disturbance

Anticipated levels of surface disturbance are listed at the beginning of the analysis for this alternative. The effects of generation of new inventory data and potential damage to cultural, paleontological, and natural history resources would be similar to those discussed for Alternative A, but on slightly more acreage.

A total of 81,493 acres of the planning area would be withdrawn from locatable mineral development under this alternative. The effect of protection of cultural, natural history, and paleontological resources from potential disturbance due to locatable mineral development in the withdrawn areas would be similar to that discussed for Alternative A, but on 821,507 fewer acres. Outside the withdrawals, those resources could be damaged by locatable mineral development, an activity that has more potential for such damage than most other surface-disturbing activities.

Plans of operations would be required for locatable minerals activities that would cause surface disturbance (except for casual use), regardless of the size of the disturbance in the Como Bluff ACEC. This would help ensure the protection of cultural, natural history, and paleontological resources from disturbance associated with locatable mineral development.

Surface disturbance in the Como Bluff NNL, the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail would be managed with application of standard protection requirements. This would help ensure the preservation of cultural, paleontological, and natural history resources in these areas.

Surface disturbance would be intensively managed within ¼ mile of the Morrison formation in the Como Bluff NNL. This would help ensure the preservation of cultural, paleontological, and natural history resources in the area.

Conclusion: Management actions for cultural resources and natural history common to all alternatives would help ensure the preservation and interpretation of these resources for present and future generations. The management emphasis afforded by ACEC designation of the Como Bluff NNL would help ensure the protection of cultural, natural history, and paleontological resources in the area.

Transferring 160 acres in the proposed Gangplank NNL, 640 acres in the Big Hollow NNL, and 160 acres in the Sand Creek NNL to individuals, organizations, agencies, or institutions that would manage the areas in accordance with their NNL status could enhance management of the natural history values in the areas. The effects of generation of new inventory data and potential damage to cultural, paleontological, and natural history resources from anticipated surface disturbance would be similar to those discussed for Alternative A, but on slightly more acreage.

Withdrawal of 81,493 acres from locatable mineral development would protect cultural, natural history, and paleontological resources from potential disturbance due to locatable mineral development in the withdrawn areas. Requirements for plans of operations for all but casual use of mining claims would help ensure the protection of cultural, natural history, and paleontological resources in the Como Bluff ACEC.

Application of standard protection requirements in the Como Bluff NNL, the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail would help ensure the preservation of cultural, paleontological, and natural history resources in those areas. Intensive management of surface disturbance within ¼ mile of the Morrison Formation in the Como Bluff NNL would help ensure the preservation of cultural, paleontological, and natural history resources in that area.

Effects on Forestry

This alternative would emphasize enhancement of the forest's growth and diversity. Timber would be harvested at a recently recalculated allowable harvest level that incorporates new inventory data and revised harvesting restrictions.

Commercial forestland in the planning area would be harvested at a rate of 20 MMBF per decade from an available base of 25,866 acres. Included in this acreage would be 6,707 acres of limited forest management activities. Approximately 16.5 MMBF of the 20 MMBF harvested during the first decade would be harvested during the first five years in response to threatening mountain pine beetle epidemics. There would be no harvesting on 309 acres of commercial forestland.

The harvest level would be about 77% of the planning area's sustained yield capability. Around 77% of the commercial forestland would be harvested over the next 100 years.

In the short term, the forest management actions outlined under Alternative C would have no appreciable impacts on the forest resource.

In the long term, the condition of about 77% of the commercial forestland would improve because mature and overmature trees would be removed and replaced with healthy reproduction. Activities would be implemented to control insect and disease problems. The success of these activities would be site specific and would depend on the timeliness and the level of implementation of control measures.

This alternative would have an accelerated harvest schedule in the first decade, primarily for mountain pine beetle control. The short-term variation from a normal harvesting schedule would provide for a better chance of success for beetle control.

Table 33 outlines the change in age class distribution of lodgepole pine over the next 100 years. This table shows that a great improvement in age class distribution would occur if Alternative C were implemented.

TABLE 33

LONG-TERM (100 YEARS) AGE CLASS REDISTRIBUTION OF LODGEPOLE PINE UNDER ALTERNATIVE C

Age Class	Present Situation (percent)	Long-Term Change Under Alternative C (percent)	Ideal Age Class Distribution (percent)
0-10	6	8	10
10-40	15	24	30
40-70	14	24	30
70	65	44	30

The condition of the commercial forestland that would not be harvested in the next 100 years (approximately 23% of the base acreage) would continue to deteriorate with increased insect, disease, and stagnation problems. These lands would not be harvested because of the restrictions placed on harvesting and because the allowable harvest level is below the sustained yield capability for the planning area.

The lack of consolidation of landownership in the forested areas under this alternative would have a considerable long-term adverse impact on the forest resource because insect and disease control would be less effective. Forest management activities would be constrained by ownership boundaries; the treatment of problem areas would have to stop at the property boundary. This situation would compromise the success of control measures because insects and diseases could reinvade the treated area. The condition of the forest would decline in the long term.

This alternative would provide timber to the local wood products industry at a higher level than in the past, with about a 50% increase in the amount of wood products made available. The average annual timber harvest would be 2 MMBF. This level of production would account for 20 jobs in the planning area. The annual revenue generated by this harvesting would amount to about $1,474,000. At an average stumpage value of $20 per MBF, the timber harvested would generate $40,000 per year to the United States government in timber sale receipts.

Conclusion: Alternative C would provide an opportunity for improving the health and productivity of a large part of the forestland. More wood products would be provided for private industry than under present management. About 77% of the commercial forestland would be under some intensity of management over the next 100 years. Restrictions prohibiting harvesting would prevent the development of a healthy productive forest on 309 acres of commercial forestland.

Forestland productivity would be expected to increase with time under this alternative; consequently, the planning area's sustained yield capability would be greater. Wood products would be available to industry above current levels. The lack of consolidation of landownership in forested areas would decrease the effectiveness of insect and disease control measures.

Effects on Lands Program

Under Alternative C, lands would be identified for disposal for community expansion and public services near Bairoil, Baggs, Rawlins, Red Desert, Saratoga, and Wamsutter. Communities in the planning area that are partially or totally surrounded by public land would have increased opportunities to acquire public land for development of public services or private uses that might not be available otherwise.

Avoidance areas for utility/transportation systems would be identified case by case. Since there would be few avoidance areas in KGSs and most utility/transportation systems would be placed in KGSs, impacts on such systems would be minimal.

Effects on Livestock Grazing

Introduction

Under Alternative C, the vegetative resource would be managed to enhance production of forage for livestock grazing. Sensitive resource values such as wildlife habitat, watershed, and riparian vegetation would be maintained or improved. Vegetation condition would be improved on "I" category allotments through intensive grazing management. New AMPs would be developed and projects implemented in support of those AMPs. (The Livestock Grazing appendix contains an explanation of the calculations used to arrive at estimated changes in AUMs.)

Management actions for lands and minerals under this alternative would slightly reduce available forage in the Divide and Seven Lakes EIS areas. The acreage disturbed and not reclaimed (and therefore the acreage taken out of forage production) would amount to approximately 13,599 acres (2,266 AUMs) over the next 20 years. This is about 1% of the available AUMs in the Divide and Seven Lakes portion of the planning area, and the loss would be considered minimal.

Some individual livestock operations could be directly affected by a lands or minerals action. If sufficient acreage was removed from the grazing base in an individual allotment, the livestock operator in that allotment might be forced to rent private pasture or to feed additional hay. The exact location and extent of future lands and minerals actions (and thus the effect on individual allotments) cannot be predicted.

No immediate change in livestock grazing use would be proposed for the Medicine Bow grazing EIS area under this alternative. However, existing data were used to predict how future ecological condition changes, the management actions discussed below, and livestock adjustments due to monitoring would affect the availability of forage. Livestock grazing use in the Medicine Bow grazing EIS area would be expected to increase above the active preference level in the long term.

Management Actions for Forestry

The proposed clearcut harvest of 200 acres of sawtimber per year and the removal of 500 acres of noncommercial, nonproductive old age stands over the next 20 years would result in approximately 3,079 AUMs of additional forage available for livestock grazing in the long term. This is 90% of the total available to be grazed by livestock and wildlife from increased understory production due to harvest.

Management Actions for Lands and Minerals

The effects on livestock grazing from management actions for lands and minerals in the Medicine Bow grazing EIS area would amount to a loss of 10,136 acres (1,689 AUMs) from the public land grazing base in the next 20 years. Actions that would result in the above loss of available forage are land disposal (7,700 acres, 1,283 AUMs), utility and transportation systems (970 acres, 162 AUMs), locatable minerals (500 acres, 83 AUMs), oil and gas development (966 acres, 161 AUMs), and coal development (all acreage disturbed would be reclaimed).

Management Actions for Livestock Grazing

Grazing systems or AMPs would be developed in the Medicine Bow grazing EIS area for intensive management of 13,140 acres of crucial winter range for big game (see Livestock Grazing appendix). The improved habitat condition would benefit both wildlife and livestock grazing. In the short term, a small amount of forage would be unavailable for livestock grazing. The winter ranges would be expected to improve through management and might produce additional forage in the long term that could be available to livestock.

The effects of implementation of 55 AMPs and construction of projects in support of these plans would be similar to those discussed under Alternative B. One difference is that 90% of the increase in forage production would be available to livestock grazing under Alternative C.

Vegetation in riparian areas would be improved through management. Management actions could include seasonal use restrictions through the AMP process, herding, or exclusion through fencing. AMPs or grazing systems would include management actions to improve the entire 1,725 acres of riparian vegetation in the "I" category allotments to good or better condition. The result would be a net increase in forage available to livestock; however, some available forage might be lost in the short term if exclusion of livestock was necessary to improve certain riparian areas. The projected increase in AUMs available to livestock grazing from riparian management is included in the total shown below for increased AUMs from AMP development.

Another difference from the effects discussed for Alternative B would result from 11,500 acres of seeding that would be added to the list of projects implemented under this alternative. Seeding of the range can be most effective following proper seedbed preparation, which could include plowing, burning, or spraying. The development of 11,500 acres of seeded range would add 6,935 more AUMs of forage for livestock grazing in allotments that receive this treatment. This is 90% of the total forage that would be made available through seeding.

As discussed in the analysis of the effects on vegetation for Alternative C, trends in ecological condition in the Medicine Bow grazing EIS area would be expected to improve in the long term under Alternative C. The amount of forage available to livestock under this alternative would increase in the long term to 189,579 AUMs from the present 161,464 AUMs.

Conclusion: The long-term availability of forage for livestock grazing would be expected to increase to 189,579 AUMs under Alternative C. Table LVGR-AP-6 in the Livestock Grazing appendix shows the estimated adjustment in authorized use, by allotment, that would result from management actions for livestock grazing in the long term.

A total of 1,390 additional AUMs would be available in the long term as a net result of management actions for lands, minerals, and forestry. Therefore, the total long-term amount of forage available for livestock would be expected to be 190,969 AUMs. This figure is 18% above active preference and 30% above the five-year average licensed use level.

Management actions for lands and minerals under Alternative C would reduce available forage in the Divide and Seven Lakes EIS areas by about 1% over the next 20 years.

Effects on Mineral Resources

Leasable Minerals-Coal

Management Actions for Minerals (Coal)

The coal available for consideration for leasing under Alternative C would be all areas in Alternative B plus 10,975 acres containing 161.9 million tons of coal in Northeast Cow Creek and Atlantic Rim. Thus, the total amount of coal available for leasing consideration under Alternative C would be 64,595 acres containing 519.1 million tons of coal. An increase in the coal reserves available for consideration for leasing would allow the BLM to respond to demand more efficiently than under present management. It would also give the BLM more flexibility to respond to changes in demand.

Management Actions for Wildlife and Fisheries

Any habitat losses due to coal development in the Baggs crucial winter range area would be mitigated through reclamation and off site habitat development. Project costs could be increased by mitigation of high priority habitat losses in coal development areas. Reclamation beyond current methods or through off-site acquisition or development would increase these costs, especially in cases where reclamation or other expenditures would be required on site as well as off site. Increased costs could affect the efficiency of coal development in this area.

Leasable Minerals-Oil and Gas

Management Actions for Cultural Resources/Natural History

The Como Bluff area has a moderate potential for oil and gas development. Intensive management to mitigate surface disturbance under ACEC designation could cause delays, increase expenses, and discourage exploration and development.

Management Actions for Lands

The effects of "split estate" on mineral development are described under "Assumptions for Minerals." These effects could occur on some of the 10,000 acres of public land that would be transferred from federal ownership over the next 20 years under Alternative C.

Management Actions for Minerals (Oil and Gas)

Management actions for KGSs would ensure timely and efficient exploration and development of land known to be valuable for oil and gas resources. Tradeoffs between oil and gas development and surface protection would favor oil and gas development. Threatened or endangered species and nationally significant cultural and natural history sites would be protected.

Outside of KGSs, standard surface protection requirements would be applied. The magnitude of the effects is difficult to predict, but generally it would depend on the amount of acreage covered by restrictions (see "Assumptions for Minerals"). The acreages of areas in which stipulations would affect leases (listed in table 1, chapter 2) are not additive because the areas overlap. However, the figures indicate that fewer acres would be affected under Alternative C than under Alternative A. A total of 895,000 acres, or 18% of the federal mineral estate in the planning area, would be affected by seasonal restrictions under Alternative C.

Management Actions for Wildlife and Fisheries

Because priority would be given to economic recovery of the oil and gas resources in KGSs (with the accompanying potential habitat losses), different types of mitigation are proposed under Alternative C to lessen impacts on wildlife. These mitigative measures would include more intensive reclamation and the acquisition and/or development of off-site habitat. The various mitigative measures could increase costs in localized situations to the extent that development could become uneconomical, especially where industry would be responsible for reclamation costs both on site and off site.

Locatable Minerals

Management Actions for Cultural Resources/Natural History

The designation of a 1,760-acre ACEC at Como Bluff would require that a plan of operations be filed and approved for any surface-disturbing activities within the ACEC boundaries. Approval of a plan of operations can take up to 90 days. Timely and efficient prospecting, exploration, and development could be adversely affected under an ACEC designation.

Management Actions for Lands

Under Alternative C, 10,000 acres of public land would be transferred from federal ownership over the next 20 years. If such actions resulted in split estate, some of this acreage could be subject to the problems in development of locatable minerals described under "Assumptions for Minerals."

Management Actions for Minerals (Locatable Minerals)

Under Alternative C, 821,507 acres of existing withdrawals would be revoked, leaving only 81,493 acres of locatable mineral withdrawals in effect. This would enhance the availability of locatable minerals. Mineral entry would not be permitted on the 81,493 acres of withdrawn lands.

Management Actions for Vegetation (Rare Plants)

Plans of operations would be required for any surface-disturbing activities that would take place in 230 acres of rare plant communities that would be designated as ACECs. Mineral exploration and development in these areas would be more costly and less efficient.

Management Actions for Wildlife and Fisheries

Under Alternative C, 108,300 acres would be designated ACECs to protect wildlife values. The necessity of filing plans of operations could inhibit timely and efficient prospecting, exploration, and development of locatable minerals.

Conclusion: Alternative C would make available for leasing consideration all coal areas with development potential. This would improve the BLM's flexibility to respond to changes in the demand for coal.

Surface protection restrictions would affect the availability of oil and gas on fewer lands than under present management. Seasonal restrictions would affect the availability of oil and gas in 18% of the planning area. Oil and gas exploration and development opportunities within KGSs would be greatly enhanced.

Mineral exploration and development would be affected by management requirements on 110,290 acres designated as ACECs. Mineral entry would be prohibited on 81,493 acres.

Effects on Recreation

Introduction

Existing recreation resources generally would be maintained under Alternative C. New recreation sites and access would be developed, but none of the new or existing recreation sites would be protected from mineral entry, and landownership consolidation would not be proposed. Therefore, there would be little overall change in the quality or quantity of recreation opportunities under this alternative.

Management Actions for Livestock Grazing

Improvements made to 43.5 miles of aquatic habitat under Alternative C would enhance fishing opportunities on small streams that currently do not support recreational fisheries or are underutilized.

Management Actions for Minerals

Leasable Minerals-Coal

Except in the Atlantic Rim coal area, development of coal under this alternative generally would not have an adverse effect on recreation resources. The analysis of effects on wildlife for this alternative indicates that elk and mule deer could be displaced by development of the Atlantic Rim coal. If the displacement occurred, the quality of hunting would be reduced in the vicinity of Atlantic Rim.

Development of the Atlantic Rim coal would not have an adverse impact on the Continental Divide National Scenic Trail. The coal area lies west of the east rim of the Continental Divide. Bridger Pass, where the divide turns to the northeast, is less than a mile away from the coal area. The remaining length of the divide in the vicinity (about 4 miles) is more than a mile away. While draglines, dust, and smoke would be visible to trail users, the impact from this would be minimal, and these coal activities would be visible for only a short distance.

Leasable Minerals-Oil and Gas

Effects on recreation from oil and gas activity under Alternative C would be the same as those of Alternative B. Recreation sites and the North Platte River would be protected from disturbance caused by oil and gas activities.

If oil and gas activity in the planning area under this alternative resulted in substantial adverse impacts on big game populations, the quality of hunting in the area could be adversely affected.

Locatable Minerals

Under Alternative C, 445 acres of existing recreation sites and 115 acres of proposed recreation sites would not be withdrawn from mineral entry.

There is low potential for locatable minerals in the Prospect Creek, Teton Reservoir, Pryor Flat, and Nine-Mile Hill existing or proposed recreation sites. Therefore, little impact would be expected from locatable minerals development in these areas.

There is moderate potential for locatable minerals around the Encampment River and Big Creek recreation sites. If mineral development occurred on these sites, there would be a significant loss of visitation because mineral development would necessarily preclude recreation uses at these sites. Visitation in 1985 was estimated to be 4,500 visits at the Encampment River site (based on traffic counter data). No information on visitation is available for Big Creek. A minimum of 4,500 recreational visits would be lost if these sites were subject to mineral development.

None of the land adjacent to the North Platte River would be withdrawn from mineral entry under Alternative C. Of main concern are areas that have high value for recreation and also have moderate or high potential for locatable minerals. Two stretches of river–1,550 acres adjacent to Bennett Peak and 795 acres adjacent to Big Creek–have moderate or high potential for minerals and also are important for fishing. (The quality of the experience in these areas is measured not only in the quality of the fishing but equally in the quality of the natural setting in which the activity occurs.)

There is moderate potential for locatable minerals along the North Platte in the areas mentioned above. While there currently are no mining claims in either the Bennett Peak area or the Big Creek area, there is no assurance that interest by mining concerns will remain low; thus, there is no assurance that the quality of the recreation experience will remain intact in the long term.

Management Actions for Recreation

The effects on recreation from recreation management under Alternative C would be similar to those described for Alternative B. The major impact would be related to the Sand Hills management area ORV designation, which would limit ORV use to designated roads and trails. Hunters would have to walk into areas where they formerly could drive.

Consolidation of landownership would not be considered under Alternative C. Potential beneficial effects discussed in Alternative A would be forgone. Opportunities for hunting and fishing would not be enhanced.

Conclusion: Overall, implementation of Alternative C would not enhance recreation resources. New recreation sites would be proposed, but neither new nor existing recreation sites would be protected from locatable mineral entry. New access to recreation sites would be sought, but landownership consolidation would not be considered.

Coal development near Atlantic Rim and oil and gas activity near Baggs might adversely affect big game populations; therefore, the quality of hunting opportunities might be adversely affected.

Effects on Soils, Water, and Air

Introduction

Assumptions about impacts presented in this analysis are discussed under "Assumptions for Soils, Water, and Air."

Management Actions for Forestry

Effects of actions for forest management for Alternative C would be similar to those discussed for Alternative A, but on a different number of acres.

Under Alternative C, 19,159 acres (17% of the forestlands) would be intensively managed for forest products. Proper timber harvest techniques would be expected to keep the short-term effects of accelerated erosion, local degradation of air quality, and degradation of water quality to a minimum. As in Alternative A, forest management in these areas would reduce accelerated erosion and improve or maintain water quality in the long term by ensuring good vegetative cover, but on a larger acreage.

Precommercial thinning would total about 900 to 1,150 acres in the next 20 years. In addition, about 500 acres of nonproductive, stagnated stands would be removed and replaced with new, vigorous trees. As in Alternative A, this would have a minimal short-term effect. In the long term, accelerated erosion would be reduced and water quality would be improved on a larger acreage than under Alternative A.

Removal of trees would produce more additional runoff than in Alternative A, since more acreage would be involved. This additional runoff would not be expected to cause the effects of downcutting and gullying described in "Assumptions for Soils, Water, and Air" because a relatively small area would be cut at any one time and because mitigative measures would be implemented.

Timber harvesting would be restricted on 6,707 acres (6% of the forestlands in the planning area) to protect soil and watershed values. Effects from this limited harvesting would be minimal because of the harvest restrictions.

Timber harvesting would be prohibited on 309 acres (less than 1% of the forestlands). As discussed for Alternative A, this would prevent potential accelerated erosion, local degradation of air quality, and degradation of water quality in the short term, but on a smaller acreage. In the long term, erosion could be increased and water quality degraded on these acres by a loss of vegetative cover through insects, disease, and fire. The effect of insect and disease losses would be expected to be minimal because vegetation loss would be gradual over time, with replacement by understory vegetation.

Management Actions for Livestock Grazing

Emphasis under Alternative C would be placed on enhancing livestock grazing rather than on enhancing soil and water resources. The development of new AMPs on "I" allotments and planned range improvements would benefit soil, water, and air resources by reducing accelerated erosion and degradation of water quality in "I" allotments.

Ecological condition would not improve under Alternative C in other allotments with a downward trend. Vegetative cover generally would be decreased as condition continued to decline. This would lead to reduced water quality and increased rates of accelerated erosion.

Planned range improvements would be designed with full consideration of soil, water, and air resources. This would maintain and improve soil productivity and water quality. These improvements could reduce accelerated soil erosion and enhance water quality by controlling stream flows, making them less erosive and protecting streamside vegetation.

The condition of 1,725 acres of riparian areas would be improved through grazing systems. Vegetative cover should increase in some of these areas where accelerated erosion is not too far advanced, albeit more slowly because of the continued grazing. In the long term, this would lead to decreased rates of accelerated erosion, which would enhance water quality by reducing salt and sediment loading.

As in Alternative B, any changes in kind of livestock from sheep to cattle would be accompanied by appropriate management actions to maintain or improve riparian condition. This would improve stream bank stability, thereby reducing stream bank erosion and improving water quality.

Management Actions for Minerals

Leasable Minerals-Coal

In addition to the coal available for leasing consideration under Alternative A, 14,815 more acres would be available under Alternative C. This includes 3,840 acres in the North Indian Springs area that would be available to be considered for leasing for in situ development only, as in Alternative B; 3,650 acres that would be available on Atlantic Rim; and 7,325 acres that would be available for consideration for subsurface mining only in Northeast Cow Creek.

It is projected that coal development would disturb about 4,000 acres over the next 20 years, regardless of the amount of coal available for leasing consideration. To a great extent the effects of this mining on soil, water, and air resources would depend on the location mined and the method of development. In situ development affects soils, water, and air less than surface or subsurface mining. The duration of subsurface coal mining is longer than that of in situ development, and the disturbance is more drastic; therefore, subsurface mining has more potential to affect soil, water, and air resources than in situ development. For Alternative C these effects would be similar to those discussed in "Effects of Management Actions Common to All Alternatives."

As was mentioned in "Effects of Management Actions Common to All Alternatives," surface disturbance from surface coal mining has a higher potential to cause unacceptable rates of accelerated erosion on specific sites than other types of anticipated coal mining activity. This is especially true for the 3,650 acres that would be available on Atlantic Rim. That area includes Jep Canyon, Snowshoe Canyon, and Hay Gulch. Steeper slopes in those drainages tend to accumulate snow, which provides moisture for the heavier vegetative cover found there.

Mining of the Atlantic Rim area drainages would remove vegetative cover, and existing contours would be difficult to replace. It is unlikely that predisturbance vegetation could be replaced because topographic and microclimatic conditions required to produce this vegetative community would be eliminated. Regardless of whether the drainages were mined, harsh climatic conditions in the form of high winds and cold temperatures, along with shallow soils, would make reclamation difficult in the Atlantic Rim area.

Most impacts from in situ coal mining would be mitigated through reclamation, because the duration of activity for this type of mining is shorter than other types of coal development, and less surface is disturbed. Impacts from the longer duration and more drastic disturbance of subsurface and surface coal mining would be mitigated somewhat by reclamation in the short term. In the long term, most of these impacts would be mitigated by reclamation after activities ended and vegetation communities became more established.

Leasable Minerals-Oil and Gas

Outside KGSs (3.5 million acres, or 70% of the federal mineral estate in the planning area) surface disturbance from oil and gas exploration and development would be restricted on up to 719,536 acres of steep slopes, riparian areas, perennial surface water, historic trails, VRM Class I and II areas, recreation sites, sage grouse leks, and high priority wildlife habitat. Surface disturbance from oil and gas exploration and development would be restricted seasonally on 895,000 acres. The effect of protection of soils and water and maintenance of air quality would be similar to that described for Alternative A, but on a smaller acreage.

Inside KGSs (1.5 million acres, or 30% of the federal mineral estate in the planning area), surface disturbance restrictions would be applied to oil and gas exploration and development only where necessary to protect significant cultural and natural history resources, migratory birds, or threatened or endangered species. The increased emphasis on oil and gas development over protection of soil, water, and air resources could lead to increased accelerated soil erosion and to degradation of water and air quality as oil and gas development occurred. This effect would be tempered somewhat by management actions to reduce accelerated soil erosion and protect water quality in the critical watersheds (about two-thirds of the KGSs). Since 38,000 acres of the raptor concentration areas lie within KGSs, surface protection stipulations would be applied there. This would help to temper the effects of oil and gas development.

Locatable Minerals

Approximately 81,493 acres would be withdrawn from locatable mineral activities under this alternative. Effects would be similar to those discussed for Alternative A, but on a much smaller acreage. Withdrawal would prevent potential accelerated erosion and degradation of water and air quality that could result from these activities.

A total of 110,290 acres would be designated ACECs in this alternative, and plans of operations would be required for all but casual use on mining claims. This would provide for mitigation of effects on soils, water, and air quality from development of locatable minerals in the ACECs.

Management Actions for Wildlife and Fisheries

Management actions for wildlife under Alternative C would protect riparian areas, improve vegetative cover, and reduce surface disturbance on 1,003,545 acres and 60 miles of streams. As in Alternative A, this would would benefit soil, water, and air resources by restricting surface disturbance and reducing the potential for resulting accelerated soil erosion, but on a larger acreage. The magnitude of these beneficial effects would be less inside KGSs than outside those areas, since priority would be given to oil and gas exploration and development inside KGSs.

Conclusion: Many of the effects of Alternative C on soils, water, and air would be similar to those described for Alternative A, but the acreage affected would be different. Intensive forest management on 19,159 acres (17% of the forestlands) would lead to acceleration of soil erosion, local degradation of air quality, and degradation of water quality, but proper timber harvest techniques would keep these effects to a minimum. In the long term, forest management could help ensure good vegetative cover, which would reduce accelerated erosion and improve water quality.

Restricted harvest on 6,707 acres (6% of the forestlands) would have minimal effects. On 309 acres (less than 1% of the forestlands) where harvesting would be prohibited, the decline in health and vigor of the forest could increase erosion and degrade water quality in the long term if wildfire occurred.

Improvement in trend and vegetative cover in "I" category allotments would lead to decreased rates of accelerated erosion. A reduction in accelerated erosion would enhance water quality by reducing salt and sediment loading. In other allotments with a downward trend, vegetation condition would not improve, and this would lead to increased rates of accelerated erosion and reduced water quality.

Improvement of 1,725 acres of riparian areas through grazing management actions would increase vegetative cover and lead to decreased rates of accelerated erosion. This improvement could occur somewhat slowly because of continued grazing during the improvement period. The improvement would enhance water quality by reducing salt and sediment loading over the long term. Management actions to maintain or improve riparian condition that would accompany changes in kind of livestock from sheep to cattle would improve stream bank stability, reduce stream bank erosion, and improve water quality.

Water and air quality would be maintained and unacceptable rates of accelerated erosion would be prevented in areas protected by surface disturbance restrictions (719,536 acres) and by seasonal restrictions on oil and gas exploration and development outside KGS areas (895,000 acres). Within KGSs, where the emphasis would be on oil and gas development rather than on protection of soil, water, and air resources, accelerated soil erosion could increase and air and water quality could be degraded.

Withdrawal of 81,493 acres from locatable mineral activities would help to prevent potential accelerated erosion and degradation of water and air quality. The requirement for plans of operations for all mining activity but casual use on 110,290 acres designated ACECs would protect soils and water and maintain air quality.

The potential for accelerated soil erosion would be reduced by management actions for wildlife designed to protect riparian areas, improve vegetative cover, and reduce surface disturbance on 1,003,545 acres and 60 miles of stream.

Under Alternative C, 14,815 more acres would be available for consideration for coal leasing than under Alternative A. Development of the 3,650 acres that would be available on Atlantic Rim would have a high potential to cause unacceptable rates of accelerated erosion. To a great extent the effects on soil, water, and air resources would depend on the location mined and the method of development. If the drainages with steeper slopes were developed, reclamation would be difficult. This could lead to accelerated erosion over the long term. Effects in other areas that would be available for consideration for leasing would be similar to those discussed under "Effects of Management Actions Common to All Alternatives."

As in all alternatives, installation of utility and transportation systems and other facilities would increase soil erosion, increase sedimentation during construction, and increase dust particulates in the air. Management actions for soils, water, and air in the Muddy Creek, Sage Creek, and Second and Third Sand Creeks watersheds would minimize potential soil compaction, removal of vegetative, sedimentation of streams, degradation of air quality, accelerated erosion, and contamination of groundwater in those areas.

Effects on Vegetation

Rangeland Vegetation

As discussed under "Assumptions for Vegetation," actions for livestock grazing and wildlife are the only actions that would have a material effect on the condition and trend of rangeland vegetation.

Under Alternative C, the vegetative resource would be managed to enhance production of forage for livestock grazing. Sensitive resource values such as wildlife habitat, watershed, and riparian vegetation would be maintained or improved. Ecological condition and vegetation trend would improve in the Medicine Bow grazing EIS area under this alternative.

Alternative C would result in an overall improvement of 4.7% in ecological condition in the Medicine Bow grazing EIS area in the long term. Changes in long-term condition and trend would be brought about by both short-term and long-term management actions. Long-term improvements in ecological condition and vegetation trend that would result from the management actions for the grazing EIS area are discussed below and are shown by allotment in table LVGR-AP-6 in the Livestock Grazing appendix.

Effects on vegetation in "M" and "C" category allotments under Alternative C generally would be the same as those described for Alternative A. Actions such as deferring livestock grazing on spring ranges would not be implemented. Management problems considered insignificant on an allotment basis do occur in the "C" allotments, and they should be monitored; however, they are not addressed in this narrative. In both the short and long terms, there would not be any great changes in the vegetation resource as compared to the existing situation.

Current levels of livestock grazing use would be continued until monitoring data could be collected. This would mean that management actions on "I" allotments would be deferred in the short term. The effects of this action and of implementing some projects before collection of monitoring data would be the same as those described for Alternative B. Licensing livestock use at the active preference level in the short term and adjusting grazing use through monitoring to achieve sustained-yield utilization levels would benefit ecological condition by stabilizing areas with a downward trend.

Grazing systems or AMPs would be developed for intensive management of 13,140 acres of big game crucial winter range to improve habitat condition. This would result in a slow improvement in ecological condition in those areas in the long term.

Spring grazing would not be deferred on "M" and "C" allotments under this alternative. Current conditions and trends would continue as at present.

The benefits of implementation of 55 AMPs and construction of projects in support of those AMPs on "I" allotments would be similar to those discussed for Alternative B. Additional benefits to the vegetative resource would result from seeding 11,500 acres of degraded sites. This action would establish desirable vegetation, which would lead to increased vegetative production and increased grazing capacities. It also would protect the soil from erosion and increase the ground cover. Seedings, once established and used in conjunction with grazing systems, would provide the additional benefit of taking some of the grazing pressure off other highly productive native ranges.

Riparian Vegetation

Under this alternative, riparian areas would be managed within the context of AMPs for the "I" allotments. A total of 1,725 acres of riparian vegetation would be improved through intensive management. In areas where grazing pressure has been high, some rest from grazing would be provided through the use of grazing systems, seasonal use restrictions, and herding and through the development of alternate watering sources for livestock. This would increase plant production, vigor, and seed production in the long term. On some riparian areas, livestock might need to be excluded for several years to allow regeneration of the woody vegetative species (willows and cottonwoods). This action probably would be implemented only after other management practices were proved unacceptable. This could further delay the improvement of some areas.

The benefits of fencing reservoirs to exclude livestock grazing would be similar to those described for Alternative B, but only new reservoirs would be fenced under Alternative C. Approximately 84 acres of new riparian vegetation could be created around new reservoirs proposed under this alternative. The actual percentage of this area that would support riparian vegetation would depend on the fluctuation in water level in the reservoirs and on the characteristics of the soils and vegetation at each reservoir site.

Rare Plants

As in Alternative A, no effects on Gibben's beardtongue would be expected because the known population is fenced and a trend study is in place.

As in Alternative B, no effects on the population of persistent sepal yellowcress would be expected because of the BLM's efforts to coordinate with the Bureau of Reclamation on monitoring the population. The BLM also would coordinate with county weed and pest control districts on weed control proposals.

The Muddy Gap cushion plant community could possibly be affected by surface disturbance from ORV use, but the effect would not be likely to occur. The community also might be affected by surface disturbance from locatable mineral development. The area is known to contain limestone deposits that may be of locatable quality; thus, the community could be disturbed by exploration and development of limestone deposits. Such disturbance is not likely since no claims have been filed on the area. The plant community would be monitored, and additional protective measures would be taken if monitoring indicated a need. This would help to ensure continued protection of the community.

Conclusion: Under Alternative C, the ecological condition and vegetation trend is expected to improve over the grazing EIS area as a whole. Table LVGR-AP-6 in the Livestock Grazing appendix shows the estimated change in ecological condition by allotment that would result from all the management actions discussed above. The improvement in ecological condition over the grazing EIS area as a whole would be 4.7%.

A total of 1,725 acres of riparian vegetation would improve slowly over the long term through intensive management practices under this alternative. This is 44% of approximately 3,911 acres of riparian vegetation in the Medicine Bow grazing EIS area. Adverse effects on rare plants would not be expected to occur.

Effects on Visual Resources

The VRM goal under Alternative C would be to minimize adverse impacts on visual resources outside of KGSs. Within KGSs, oil and gas activities would have priority over VRM objectives.

Under this alternative, surface disturbance related to oil and gas would be restricted on 183,000 acres of VRM Class I and II areas. However, 11,000 acres of VRM Class I lie within the Washakie Basin KGS, where oil and gas activities would have priority over VRM objectives. There would be no long-term protection for valuable visual resources in this area, and visual quality could be degraded.

Effects on Wildlife and Fisheries

Introduction

The goal of the wildlife and fisheries program under Alternative C would be to continue present management practices under modified land-use plans that would emphasize resolving resource conflicts with wildlife and their habitat values. This would be accomplished through intensive management, which would mitigate impacts on wildlife from surface-disturbing activities. The Wildlife appendix contains a discussion of typical impacts on wildlife and fisheries from various types of activities.

Management Actions for Forestry

Timber harvest areas under Alternative C would be the same as those identified for Alternative A, but the level of harvest would be increased to 2,000 acres per decade. The rate of timber harvest would be accelerated, with 16.5 MMBF being harvested in the first five years in response to mountain pine beetle activity.

Impacts described for Alternative A generally would apply to Alternative C, with the following modifications.

Roads and increased human activity under Alternative C would have greater short-term adverse impacts on wildlife, especially big game, than under Alternative A. In the long term, adverse effects would be minimized through long periods (20 years) of nondisturbance.

The reduction in elk security cover on Shirley Mountain, when combined with the increase in human activity associated with roads, could become a consequential adverse impact. This could result in displacement of elk to possibly suboptimal habitat.

Management Actions for Livestock Grazing

The effects on wildlife habitat from increased livestock numbers (or longer seasons of use) would vary between allotments, depending on the resulting distribution of the livestock. If new range improvements on upland sites attracted livestock away from the high priority riparian habitats onto moderate or low priority habitat types, there would be important benefits to the wildlife communities.

Reduced ungulate use of the riparian zones would improve the existing situation by allowing plants to retain more vegetative matter as residual cover and to produce young growth successfully. Over a given time, vegetative structural diversity (and therefore wildlife diversity) would be maintained or improved as different age classes of woody plants matured. However, if increased livestock numbers resulted in more animals using the bottoms at a level greater than the existing situation, then these areas would be expected to decline at a greater rate. Woody plant reproduction would not have the opportunity to replace old decadent plants, so there would be a long-term loss of the canopy species. As structural diversity of the vegetation declined, animal diversity also would decline.

Effects on big game animals from livestock grazing actions under this alternative could be beneficial or detrimental, depending on the location of the range improvements in relation to the seasonal ranges. Changes in livestock distribution that would reduce forage competition on crucial winter ranges would be of great benefit, regardless of increased livestock numbers. However, if the increased numbers resulted in greater forage competition and decline of crucial range condition, big game objectives would have to be reduced to be within grazing capacities.

For a discussion of the fisheries variables and assumptions used in this analysis, see the "Assumptions" section of this chapter.

Under Alternative C, emphasis in livestock grazing management in the Medicine Bow grazing EIS area would be placed on maintaining existing habitat conditions while increasing AUMs in "I" category allotments. With no new areas excluded from grazing and without emphasis on improving fisheries, the effect on fisheries from selection of this alternative would be largely neutral. However, any change in kind of livestock from sheep to cattle would be monitored and actions taken to maintain trout stream habitat.

In the rest of the planning area, there would be an improvement on up to 43.5 miles of trout stream habitat in "I" category allotments. No large new reservoirs would be likely to be added, so the potential positive effects from such reservoirs would not be realized. Any change in kind of livestock from sheep to cattle would cause habitat degradation in some allotments.

Management Actions for Minerals

Leasable Minerals-Coal

It is projected that coal mining activities will disturb about 4,000 acres in the next 20 years, regardless of the amount of coal available. The effects on wildlife from this mining would depend to a great extent on the location mined and the method of development.

Effects on wildlife and wildlife habitat from coal activities under Alternative C would be similar to the effects from Alternative B. The Atlantic Rim and Northeast Cow Creek areas would be added to the coal areas available for leasing consideration. Effects from those areas are analyzed below.

Atlantic Rim. Impacts from surface mining on Atlantic Rim would vary, depending on the "scenario" of the particular mining plan adopted. Mitigative measures for this area were recommended in the recently completed Little Snake River KRCRA Elk Study (Ward 1985). All but one of those measures would be required as lease conditions (see the Coal appendix).

In the following analysis for Atlantic Rim, the "scenario" presented represents a maximum level of development that could occur within environmental constraints. It should be kept in mind that no mining scenario has been adopted, and there are many possible scenarios that would result in varied impacts.

Mining on Atlantic Rim would include four pits (three south of Jep Canyon and one north of Jep Canyon) totaling 1,889 acres. Approximately 60 to 80 acres per year would be mined in the northern pit and one of the southern pits concurrently. Mining would be done on the westernmost slopes; however, mining activity and disturbance would not be allowed in Jep Canyon, Snowshoe Canyon, and Hay Gulch. As stated previously, all recommended mitigation (Ward 1985) would be applied except the recommendation that mining be restricted to one pit at a time. Approximately 770 additional acres of sagebrush-mixed grass steppe habitat type would be disturbed for surface and transportation facilities during the first year of operation.

The Atlantic Rim area comprises a complex mosaic of nine diverse vegetation communities, as follows:

Greasewood-sagebrush riparian shrubland
Short grassland
Sagebrush-mixed grass steppe
Big sagebrush-rabbitbrush steppe
Quaking aspen
Mountain shrubland
Willow-waterbirch riparian shrubland
Riparian grassland
Open aquatic-emergent grassland

The last five communities named are high-priority habitat types for wildlife. At least six of these communities would be disrupted during or throughout the life of the mine; the last three listed would not be affected by mining operations and disturbance.

Additionally, there would be a loss of "edge effect" as various vegetation communities were mined or disturbed. An estimated total of ¼ to ⅓ of the mining area (472 to 630 acres) is rated high priority wildlife habitat. This is a substantially greater amount of high priority habitat than on other surface mines or potential coal development areas in the Rawlins District.

Reclamation would be progressive, proceeding concurrently with mining operations. As mining was completed in one portion of an area to be mined, reclamation would begin in that portion while mining operations proceeded to the next portion. The reclaimed land would be stabilized in a few years and available for use. Full restoration of the land and its vegetation to the premining condition would require a longer time. Although the area would be reclaimed, it is questionable whether the complex mosaic of the current vegetation types could be restored. Reclamation practices, hydrologic impacts, and postmining soil characteristics would determine the vegetation that could be supported for postmining use.

It may be completely unreasonable to assume that postmining conditions would support premining vegetative composition and densities. Cool season grasses are relatively easy to reestablish. Reestablishment of sagebrush, mountain shrub, and aspen types is much more difficult. If the complex mosaic of the current vegetation types could not be restored, there would be irreversible and irretrievable adverse impacts on the 100 wildlife species that are supported by this habitat. The habitat could be lost.

Open-pit mining in the Atlantic Rim area could disrupt up to an estimated total of 2,300 acres of crucial winter range for elk over the life of the mine. This is approximately 3% of the total Baggs crucial winter range for elk. Although the percentage appears small, the Atlantic Rim area, including the estimated 2,300 acres that would be disrupted, constitutes an extremely important part of the winter range.

During the severest winters, such as the one that occurred in 1983-84, the Atlantic Rim area supports 600 elk. These elk are 75% of all the elk using the north end of the Little Snake River KRCRA for winter range, and 30% of all the elk wintering on both the north and south ends of the KRCRA in Wyoming. Since elk use in this area increases with greater snow accumulation and more severe weather, impacts from habitat disruption become more pronounced in tougher winters. During normal winters, approximately 200 to 250 elk winter in the Atlantic Rim area, and use is less concentrated.

Disruption of habitat caused by mining activities and disturbance creates additional habitat loss through the creation of avoidance zones. The harassment of resident and migrant elk during coal mining would be expected to displace elk as far as 2 miles during the first year or two (Ward 1985). Information from studies in Idaho (Kuck 1984) and Colorado (Johnson 1985) show that elk will make adjustments in response to the human activities associated with mining and that the area of influence could be expected to be reduced to less than 0.25 mile within a few years if harassment directed at elk was controlled.

The applicability of those study results is severely limited, however, in that the wintering elk on Atlantic Rim use topographic features rather than trees to satisfy their requirements for thermal cover and security cover. This could result in greater long-term displacement distances than was indicated in the Idaho and Colorado studies. With mining, elk use would be expected to be concentrated more on the north end of Atlantic Rim, especially during more severe winters.

The severity of impacts on wintering elk on Atlantic Rim would depend on the severity of the winter and application of the recommended mitigative measures. During normal or light winters, elk displacement would be more likely to be to the south. Mitigative measures that would reduce competition with cattle for forage would substantially reduce the impact of displacement. Impacts on elk displaced from Atlantic Rim would be further minimized by habitat improvements to increase the quality and quantity of forage and cover on elk crucial winter range to the south of Atlantic Rim (Northeast Cow Creek area).

Any mining activity or disturbance that would inhibit movement to the north end of Atlantic Rim during severe winters would place additional hardships and stress on animals in negative energy balances. However, the recommended mitigation would prevent any inhibition of movement along the rim; thus, the effects of mining on elk during severe winters would be minimal.

Disturbance and probable long-term loss of the aspen communities within the mining area would be detrimental to the 40 to 100 resident elk that use this community types as primary thermal and hiding cover during summer and fall. However, it appears that these resident elk would be displaced to adjacent undisturbed aspen communities and that effects on the elk would be minimal.

As many as 200 to 300 summering and 50 wintering mule deer would be adversely affected by disrupted habitat and human disturbances. Animal distributions probably would be strongly influenced by mining activities. However, deer are less sensitive to disturbance than elk; thus, displacement would be considerably less and habituation much more likely. Of particular benefit to mule deer would be avoidance of mountain shrub and aspen communities by mining operations. Successful reclamation of these communities is unlikely, so if mining operations did not avoid them, there would be an irreversible and irretrievable loss of habitat.

Some sage grouse nesting habitat would be disrupted by mining in the Atlantic Rim area, and the strutting ground in T. 19 N., R. 90 W., Section 23, could be adversely affected when roads and railroads are located. While impacts could be locally detrimental, overall effects on the sage grouse population would be negligible.

In the short term, mining could cause nest abandonment for one pair of golden eagles and one pair of prairie falcons. According to raptor investigations conducted in the Hanna Basin coal tracts, leaving suitable highwalls after mining provides nesting substrates. If such highwalls were left in the Atlantic Rim area, golden eagles and prairie falcons could benefit from the resulting nesting substrates.

Coal mining could cause a pair of goshawks and 30% of the known active Cooper's hawks nesting in the Divide Resource Area to abandon their nests. This could be a highly consequential loss of limited suitable nesting structures for accipiters. Disturbance of aspen communities would be particularly detrimental to accipiters; it would constitute an irreversible and irretrievable loss of nesting and hunting habitat.

Mountain shrub, willow-riparian, and aspen habitat types are structurally diverse types important for small mammals and numerous bird species. Mine operations would result in a loss of a considerable amount of mountain shrub and aspen habitat. Consequently, animals using these habitat types would be displaced or lost. Since reestablishment of the premining habitat mosaic is unlikely in the mined areas, postmining wildlife species would be greatly reduced. Mine operations should not affect willow-riparian habitat since the major drainage bottoms where this habitat is found would not be mined and sediment flow would be contained.

If Atlantic Rim and the Savery PRLA areas were mined at the same time, there would be detrimental cumulative impacts on elk in that there would be greater loss of habitat and more harassment of the herd.

Northeast Cow Creek. Most of the habitat on public land in the Northeast Cow Creek area falls into the moderate priority category. Federal lands in the area consist of the sagebrush-mixed grass, big sagebrush-rabbitbrush, and saltbush steppe habitat types. Since subsurface operations would disturb little of the BLM-administered public surface in the area, surface disturbance of habitat would be expected to be minimal.

Transportation systems could cause consequential adverse effects. The transportation alternative that would use the existing Cow Creek Butte road west to Wyoming Highway 789 would cause the fewest adverse impacts on elk; however, this alternative could cause additional settlement in the town of Baggs. Increased settlement in Baggs or the Little Snake River valley, which would result in increased human activity and habitat loss, could cause adverse effects on mule deer crucial winter range, pronghorn antelope crucial winter range, and wintering areas for bald eagles and other raptors (USDI, BLM 1982). Although this access to Wyoming 789 crosses mule deer and pronghorn crucial winter range and a raptor concentration area, impacts from the road itself would be expected to be minimal provided the road would not be fenced. The existing road is good year-round access to oil and gas activity. The other transportation alternative would cross 14 miles of elk crucial winter range and would open year-round access to an area that now has limited public access. That route would cause greater adverse impacts (Ward 1985).

Subsidence, air vent shafts, and access roads to the vents are additional surface disturbances that would be expected to cause minimal disturbance of wildlife. Subsidence could benefit or adversely affect habitat, depending on the slope, size, degree, and depth. The extent of subsidence cannot be determined until a detailed underground mine plan is developed. Vent shafts would need periodic maintenance, but impacts from the habitat disturbed and human presence would not be significant. However, if these facilities were located within line of sight of the Deep Gulch drainage, adverse impacts could occur, since this drainage is a high elk use area.

Direct effects on elk from mine operation would be expected to be minimal provided that surface facilities would occupy approximately 40 acres in the S1/2SW¼ section 12, T. 16 N., R. 91 W., and that the mitigative measures described under this analysis would be followed. Variations from these conditions could cause important adverse impacts and could justify another analysis.

The rationale for projecting minimal mining impacts is as follows:

> Since the operation would be a subsurface mine, there would be considerably less disturbance than from a surface mine.
>
> There are surface mine facilities near the edge of the delineated crucial winter range. In all winter counts since the winter of 1978-79, the largest number of elk observed within 2 miles of the possible surface facility location during a severe winter was 83.
>
> On the basis of several field examinations, it is the professional judgment of BLM personnel that the proposed surface facilities probably would not be located within a mile of high elk use areas.
>
> The disturbance of 40 acres would have minimal effects, considering its location and the surrounding habitat.

Effects on mule deer and mule deer habitat would be minimal. Mule deer displaced by mining activity would be easily accommodated by the surrounding area. Transportation systems should not be fenced.

The area is used by pronghorn during the spring, summer, and fall. Approximately 150 adult antelope summer on the Deep Gulch allotment, which covers approximately 25% of the Northeast Cow Creek area. Pronghorn use the sagebrush/mixed grass and big sagebrush/rabbitbrush habitat types until late fall, when they migrate out of the area into one of the two crucial winter ranges within the data analysis unit (see map 49 in chapter 3, which shows herd unit boundaries). It is unknown whether these animals use specific migration corridors; however, it is suspected that their migration is largely influenced by environmental factors.

Pronghorn migrate into the area in the spring and away from it in the fall. It is not likely that the projected surface disturbances or human presence would displace many of them. Any displaced animals would easily be accommodated by the surrounding area. Transportation systems would not cause adverse impacts as long as they were not fenced.

Sage grouse are yearlong residents of the area, where they use primarily the sagebrush habitat types. During brooding periods, they also make use of riparian areas.

The Northeast Cow Creek area contains two strutting grounds, and the nesting habitats from three other strutting grounds overlap the area. Thus, the entire area is part of a larger breeding/nesting complex. This complex contains a fairly concentrated population of sage grouse; however, no population estimate is available. A subsurface mine would cause minimal disruption of sage grouse or their habitat. Mitigation and specific placement of facilities should alleviate any adverse impacts.

In comparison with the rest of the planning area, the Northeast Cow Creek area and surrounding lands are not high quality raptor habitat. At present there is one active golden eagle nest on a south-facing cliff in Deep Gulch, at the extreme southern end of the area. Two additional golden eagle nests along the periphery of the coal area are in poor condition. One inactive ferruginous hawk nest has been observed within the area, but it was not relocated during recent intensive field exams. Four additional inactive ferruginous hawk nests have been located near the area, but all are in fair to poor condition.

In addition to the nesting population, wintering populations of bald eagles, golden eagles, great horned owls, and rough-legged hawks inhabit the area. A small number of bald eagles winter in the Sand Hills; however, they probably do not spend much time within the coal area. During the winter of 1979-80, the WGFD estimated that there was a wintering golden eagle population of 3.8 eagles (primarily juveniles) per square mile (BLM Contract No. 1A-512-CT7-7). This is a fairly dense wintering population of eagles.

Detrimental effects on raptors would not be expected. The active golden eagle nest would be protected under the coal unsuitability criteria and the Bald Eagle Protection Act. Subsurface mine operations would not interfere with the nest or the nesting pair because of their location.

The rationale used during the unsuitability review and multiple-use planning for ferruginous hawks was to protect raptor concentration areas of species of high federal interest. Protecting isolated nests, especially inactive nests, was judged not to be the most effective means of benefiting the species.

Bald eagles have been observed using the area during the winter. This use is usually restricted to the area around the Willows and to Alamosa Canyon. Both these areas lie outside of the coal area but could be affected by facilities and transportation routes.

Colonies of white-tailed prairie dogs are found in the area. These colonies may provide suitable habitat for the black-footed ferret, but a search during the 1981 field season by the U.S. Fish and Wildlife Service did not produce any evidence of ferrets.

Because of the small amount of disturbance anticipated for a subsurface mine, adverse impacts on threatened or endangered species would not be expected.

Leasable Minerals-Oil and Gas

Under Alternative C, management actions for the oil and gas program for the planning area would be similar to those of Alternative A, but they would vary for different areas within the planning area, depending on the potential for the occurrence of oil and gas. Management actions would be applied differently to two major categories: (a) KGSs and (b) areas with high, moderate, and low potential for oil and gas.

The absence of surface protection restrictions in KGS oil and gas areas could result in adverse effects on big game and sage grouse habitat, waterfowl, beaver, and a variety of other wildlife species associated with open waters and riparian areas. These could be highly detrimental long-term impacts, and an irreversible and irretrievable commitment of resources could result, depending on the extent of oil and gas development.

High priority habitat losses in the KGS oil and gas areas would be mitigated through reclamation and acquisition and/or development of off-site habitat. To the extent this would be possible, the potential for irreversible and irretrievable commitment of resources would be reduced. However, effects that would occur in some wildlife use areas are not known to be mitigable (for example, sage grouse leks), and some high priority habitats such as aspen communities are not reclaimable with current knowledge and techniques.

Seasonal stipulations to protect big game animals on crucial winter range and sage grouse in nesting areas would not be applied in KGS oil and gas areas. These animals would be subject to population-depressing factors such as stress, reduced reproduction, and increased mortality. Raptor concentration areas and isolated nest sites within KGS oil and gas areas would be protected by seasonal stipulations, as in Alternative A.

Alternative C could have long-term detrimental impacts on the Baggs elk and mule deer herds if the surface protection restrictions were eliminated on their winter ranges within the KGS oil and gas area. Heavy habitat losses could cause major reductions in elk and mule deer carrying capacity and thus in population levels.

Surface-disturbing activities, including oil and gas activities, would be restricted and intensively managed to maintain nesting habitat on 100,000 acres of raptor concentration areas. This would help to minimize effects on raptor nesting habitat from oil and gas exploration and development.

The Sand Hills area (see ACEC folded map) would be intensively managed to minimize impacts on the ecosystem from surface-disturbing activities, including those from oil and gas exploration and development.

Standard surface protection requirements would apply to all areas outside the KGS oil and gas area, and impacts would be as described in Alternative A.

Locatable Minerals

Under Alternative C, impacts on wildlife would be similar to those of Alternative A except for the following changes:

The 41,245 acres of public water reserve withdrawals would be revoked; thus, these areas would be open to nonmetalliferous mineral entry. This would increase the potential for long-term adverse impacts on riparian habitat in specific areas and thus on a variety of wildlife and fish species.

The 564,758-acre withdrawal for oil shale development (South Desert HMP area) would be revoked.

While no uranium production is occurring at present in the Poison Basin area west of Baggs, a resumption of mining in the near future is a real possibility. Previous mining was not on a large scale, and adverse impacts on wildlife were minimal. If extensive uranium mining should occur in this area, there could be long-term impacts on sage grouse, antelope, and mule deer. Potentially 17,920 acres of sage grouse breeding/nesting habitat, 8,900 acres of crucial winter range for antelope, and 18,300 acres of crucial winter range for mule deer could be damaged through large-scale uranium development. Cumulative adverse impacts on mule deer also could occur from the combination of uranium mining and oil and gas development.

Revocation of the 810-acre withdrawal on Bennett Peak would open areas of elk, mule deer, and bighorn sheep crucial winter ranges that are now closed. If extensive mineral exploration and mining should occur in these areas, the resulting surface disturbance and human activity could have long-term adverse impacts on these species.

The reduction in adverse effects described under Alternative B for raptor ACECs from spatial and temporal management of disturbance would be the same under Alternative C, but it would apply to 20,300 more acres in four additional raptor concentration areas.

Plans of operations required on the 1,760-acre Como Bluff ACEC would include consideration of wildlife values and therefore could reduce adverse effects on antelope on 1,760 acres of crucial winter range through maintenance of habitat values.

Plans of operations also would be required in the 8,300-acre Sand Hills ACEC. This requirement would control and mitigate surface disturbance and physiological disturbance of wildlife on crucial and important habitat. Adverse effects could be minimized for mule deer, elk, sage grouse, and a variety of other species.

Management Actions for Recreation

Effects on wildlife and habitat from recreation management under Alternative C would be the same as those described for Alternative B, with ORV use in the Sand Hills area limited to designated roads and trails.

Management Actions for Wildlife and Fisheries

Under Alternative C, management actions for wildlife and fisheries would be similar to those of Alternative A; however, the objectives would differ between KGS and non-KGS oil and gas areas. Within KGS areas, wildlife management objectives would be to mitigate habitat losses and disturbance. In non-KGS areas, the objective would be to manage habitat losses and disturbance so that important and crucial wildlife and fisheries habitat would be maintained or improved.

Within KGS and coal development areas, maintenance and improvement of high priority wildlife habitat, including riparian and fisheries habitat, would not receive special management emphasis. This would also be the situation in special use areas (grouse leks and crucial winter ranges for Baggs elk and other big game). The Baggs elk crucial winter range would not be designated as an ACEC. While mitigation such as reclamation and off-site development would be emphasized, the success of mitigation could be affected by many factors, including available technology, economics, and lessee cooperation. Substantial and important habitat loss could occur within the KGS areas in the long term, resulting in highly detrimental effects on the wildlife resource.

All 13 raptor concentration areas (100,000 acres) would be designated as ACECs with spatial and temporal management of disturbance.

The Sand Hills area would be designated an ACEC, with spatial and temporal management of disturbance. Adverse effects would be reduced on crucial winter range for elk and mule deer and on the fragile ecosystem in general. As in Alternative B, ORV use in the Sand Hills would be restricted to designated roads and trails. This would reduce adverse impacts from ORVs and minimize cumulative impacts with those from energy development.

Since sage grouse and sharp-tailed grouse leks and nesting areas would not be protected by "no surface disturbance" or seasonal restrictions in KGS areas, there would be an attempt to mitigate the losses. However, state-of-the-art knowledge for mitigating the loss of strutting/dancing grounds is inadequate, and a high degree of success cannot be predicted or anticipated. Therefore, there could be population-depressing long-term adverse effects on sage grouse (disruption of reproductive activity). Adverse consequences for sharp-tailed grouse would be similar to the effects on sage grouse.

Under this alternative, wildlife habitat management plans would be developed for four additional areas.

Management actions for the white pelican nesting colony would be the same as those for Alternative B except that the island would not be designated an ACEC. The effects would be the same as those of Alternative B, with the continued viability of the nesting colony greatly enhanced.

Conclusion: Impacts on wildlife and fisheries from forestry management actions under Alternative C would be somewhat greater in the short term than under present management. Because of accelerated harvest and greater volume of harvest, short-term adverse impacts associated with roads and increased human activity would be greater for big game and other wildlife species. The combination of reduced elk security cover on Shirley Mountain and increased human activity associated with roads could cause a consequential adverse effect on elk. In the long term, maintenance of important habitat values would be ensured by application of forest wildlife habitat guidelines and by maintenance of forest age class and habitat diversity.

Effects on wildlife from livestock grazing management actions would vary among allotments and could be either adverse or beneficial, depending on the effect of range improvements on livestock distribution.

The overall effects of livestock grazing management on fisheries would be neutral over the planning area as a whole.

Cumulative impacts related to energy development could require adjustment to lower grazing capacities and thus to reduced big game population objectives. These reductions potentially could be substantial, especially if crucial winter ranges were affected.

Effects on wildlife outside KGS areas would be similar to those of Alternative A. Within KGS areas, standard protection requirements would not be applied except to raptor nesting habitat; however, mitigation would be stressed. There could be long-term detrimental effects on many species from loss of high priority habitat and special use areas and from disturbance during critical periods.

The Sand Hills area would be designated an ACEC and managed to minimize long-term adverse effects on elk, mule deer, and other wildlife species through minimized surface disturbance and physiological disturbance.

As in Alternative B, the continued viability of the nesting colony of white pelicans would be greatly enhanced.

ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVE D

Introduction

Under Alternative D, a balance between the use of restrictions and the application of intensive management activities would result in optimal resource management. Alternative D is the preferred alternative.

The analysis of environmental consequences of Alternative D was based on the anticipated levels of resource use or development. Some of these uses or developments are not management plans or proposals and are not listed as such in table 1 in chapter 2. Rather, they represent feasible activities that could be expected to result from the management actions that would be carried out under this alternative. They generally are dependent on market conditions beyond BLM control.

Anticipated Developments

Surface disturbance would be reclaimed as described under "Assumptions" at the beginning of this chapter. The assumed levels of development that were used in the analysis of Alternative D are presented here to give the reader a more complete understanding of the analysis. The following levels are projected for a 20-year period:

Clearcutting-4,000 acres (average of 200 acres per year)

Temporary logging roads-40 miles (average of 2 miles per year)

Land disposal-10,000 acres (average of 500 acres per year)

Surface disturbance from the following activities at the rates shown:

- Utility and transportation system development and maintenance-5,030 acres (average of 251.5 acres per year)
- Coal mining-4,000 acres (average of 200 acres per year)
- Oil and gas development-34,355 acres (average of 1,717.75 acres per year)
- Uranium mining-1,500 acres (average of 75 acres per year)

Effects on Cultural Resources/Natural History

Introduction

Assumptions about the effects of surface disturbance on cultural resources and natural history are discussed in the "Assumptions" section of this chapter.

Management Actions for Cultural Resources/Natural History

The Como Bluff NNL would be designated an ACEC under Alternative D. The management emphasis afforded by the designation would help ensure the protection of cultural, natural history, and paleontological resources in the area.

Consideration would be given to transferring from federal ownership 160 acres in the proposed Gangplank NNL, 640 acres in the Big Hollow NNL, and 160 acres in the Sand Creek NNL. The areas would be considered for transfer to individuals, organizations, agencies, or institutions that would manage the areas in accordance with their NNL status. This could enhance management of the natural history values in the areas because the effectiveness of current BLM management is limited by lack of legal access to the relatively small public land parcels in areas that are predominantly in other ownerships.

Management Actions Involving Surface Disturbance

Anticipated levels of surface disturbance are discussed at the beginning of the analysis for this alternative. The effects of generation of new inventory data and the potential damage to cultural, paleontological, and natural history resources would be similar to those discussed for Alternative A, but on slightly more acreage.

A total of 83,063 acres of the planning area would be withdrawn from locatable mineral development in this alternative. The effects of protection of cultural, natural history, and paleontological resources from potential disturbance due to locatable mineral development in the withdrawn areas would be similar to those discussed for Alternative A, but on 819,937 fewer acres. The withdrawal would include intact segments of the Overland Trail. Outside the withdrawals, those resources could be damaged by locatable mineral development, an activity that has more potential for such damage than most other surface-disturbing activities.

Plans of operations would be required for locatable minerals activities that would cause surface disturbance (except for casual use), regardless of the size of the disturbance in the Como Bluff ACEC. This would help ensure the protection of cultural, natural history, and paleontological resources from disturbance associated with locatable mineral development.

Surface disturbance in the Como Bluff NNL, the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail would be managed through application of standard protection requirements. This would help ensure the preservation of cultural, paleontological, and natural history resources in those areas.

Surface disturbance would be intensively managed within ¼ mile of the Morrison Formation in the Como Bluff NNL. This would help ensure the preservation of cultural, paleontological, and natural history resources in that area.

Conclusion: The effects on cultural resources and natural history under Alternative D would be similar to those of Alternative C. Management actions for cultural resources and natural history common to all alternatives would help ensure the preservation and interpretation of these resources for present and future generations. The management emphasis afforded by ACEC designation of the Como Bluff NNL would help ensure the protection of cultural, natural history, and paleontological resources in the area.

Transferring 160 acres in the proposed Gangplank NNL, 640 acres in the Big Hollow NNL, and 160 acres in the Sand Creek NNL to individuals, organizations, agencies, or institutions that would manage the areas in accordance with their NNL status could enhance management of the natural history values in the areas. The effects of generation of new inventory data and potential damage to cultural, paleontological, and natural history resources from anticipated surface disturbance would be similar to those discussed for Alternative A, but on slightly more acreage.

Withdrawal of 83,063 acres from locatable mineral development would protect cultural, natural history, and paleontological resources from potential disturbance due to locatable mineral development in the withdrawn areas, which include intact segments of the Overland Trail. Requirements for plans of operations for all but casual use of mining claims would help ensure the protection of cultural, natural history, and paleontological resources in the Como Bluff ACEC.

Application of standard protection requirements in the Como Bluff NNL, the Overland Trail, the Cherokee Trail, and the Rawlins-Fort Washakie Trail would help ensure the preservation of cultural, paleontological, and natural history resources in those areas. Intensive management of surface disturbance within ¼ mile of the Morrison Formation in the Como Bluff NNL would help ensure the preservation of cultural, paleontological, and natural history resources in that area.

Effects on Forestry

Except for the effects from land consolidation, the effects on forestry under Alternative D from management actions for forestry would be the same as those described for Alternative C. The effects of land consolidation are discussed below.

This alternative would provide an opportunity for improving the health and productivity of the forest and for providing wood products to private industry. About 77% of the commercial forestland would be under some intensity of management over the next 100 years. Restrictions on harvesting would prevent the development of a healthy, productive forest on 309 acres of commercial forestland in the long term.

Forestland productivity would be expected to increase with time and consequently raise the planning area's sustained-yield capability. Wood products would be available to industry above current levels.

The improvement in age class distribution of lodgepole pine would be the same as in Alternative C.

The average annual timber harvest under this alternative would be 2 MMBF. This level of production would account for 20 jobs in the planning area. The annual revenue generated by this harvesting would amount to about $1,474,000. At an average stumpage value of $20 per MBF, the timber harvested would generate $40,000 per year to the United States government in timber sale receipts.

Consolidation of landownership on Elk Mountain and Shirley Mountain would have a long-term beneficial effect on the forest resource because insect and disease control would be more effective. Forest management activities would not be constrained by ownership boundaries; therefore, each problem area would be treated as an entity and in a timely manner. This would greatly improve the degree of success for the particular control measure. The condition of the forestlands would improve in the long term.

Conclusion: As in Alternative C, the opportunity to improve the health and productivity of the forestlands and to provide wood products to private industry would be greater under Alternative D than under present management. In addition, consolidation of landownership on Elk Mountain and Shirley Mountain would enhance the forest resource by facilitating insect and disease control.

Effects on Lands Program

Under Alternative D, lands would be identified for disposal for community expansion and public services near Bairoil, Baggs, Rawlins, Red Desert, and Wamsutter. Communities partially or totally surrounded by public lands would have increased opportunities to acquire public land for development of public services or private uses that otherwise might not be available.

Areas containing high value or fragile cultural and natural history resources, visual resources, watersheds and soils, and wildlife habitat would be identified as avoidance areas for utility and transportation systems (see map 4). Routing developments around such areas could force installation of facilities in less than ideal areas that are longer, rougher, and more difficult to reclaim, increasing project costs. Relatively small avoidance areas wound not have as great an effect as larger ones, since small areas generally could be avoided easily. If an area could not be avoided, effects of facility development would have to be mitigated, and mitigation would add cost to the project. The amount of any increased cost cannot be determined at this time.

Effects on Livestock Grazing

Introduction

Under Alternative D, the vegetative resource would be managed to enhance livestock grazing while maintaining a balance between economic uses and management so that wildlife habitat, watershed, and riparian vegetation also would be enhanced. Vegetation condition would be improved on "I" category allotments through intensive grazing management. New AMPs would be developed and projects implemented in support of those AMPs. (The Livestock Grazing appendix contains an explanation of the calculations used to arrive at estimated changes in AUMs.)

Management actions for lands and minerals under this alternative would slightly reduce available forage in the Divide and Seven Lakes EIS areas. The acreage disturbed and not reclaimed (and therefore the acreage taken out of forage production) would amount to approximately 12,799 acres (2,133 AUMs) over the next 20 years. This is about 1% of the available AUMs in the Divide and Seven Lakes portion of the planning area, and the loss would be considered minimal.

Some individual livestock operations could be directly affected by a lands or minerals action. If sufficient acreage was removed from the grazing base in an individual allotment, the livestock operator in that allotment might be forced to rent private pasture or to feed additional hay. The exact location and extent of future lands and minerals actions (and thus the effect on individual allotments) cannot be predicted.

No immediate change in livestock grazing use would be proposed for the Medicine Bow grazing EIS area under this alternative. However, existing data were used to predict how future ecological condition changes, the management actions discussed below, and livestock adjustments due to monitoring would affect the availability of forage. Livestock grazing use in the Medicine Bow grazing EIS area would be expected to increase above the active preference level in the long term.

Management Actions for Forestry

The impacts of harvest of 200 acres of sawtimber and the removal of 500 acres of noncommercial, nonproductive old age stands in the next 20 years would be the same as under Alternative C; 3,079 AUMs of additional forage available for livestock grazing in the long term.

Management Actions for Lands and Minerals

The effects on livestock grazing from management actions for lands and minerals in the Medicine Bow grazing EIS area would amount to a loss of 10,936 acres (1,823 AUMs) from the public land grazing base in the next 20 years. Actions that would result in the above loss of available forage are land disposal (8,500 acres, 1,417 AUMs), utility and transportation systems (970 acres, 162 AUMs), locatable minerals (500 acres, 83 AUMs), oil and gas development (966 acres, 161 AUMs), and coal development (all acreage disturbed would be reclaimed).

Management Actions for Livestock Grazing

The exclusion of livestock grazing from 1,120 acres of big game crucial winter range would make 187 AUMs of forage unavailable to livestock.

Grazing systems or AMPs would be developed in the Medicine Bow grazing EIS area for intensive management of 12,020 acres of crucial winter range for big game (see the Livestock Grazing appendix). The improved habitat condition would benefit both wildlife and livestock grazing. In the short term, a small amount of forage would be unavailable for livestock grazing. The winter ranges would be expected to improve through management and might produce additional forage in the long term that could be available to livestock.

The effects of implementation 55 AMPs and construction of projects in support of these plans would be the same as those from Alternative C except that 80% of the increase in forage production would be available for livestock grazing.

Vegetation in riparian areas would be improved through management. Management actions could include fencing to exclude livestock grazing. Approximately 67 acres of riparian stream zones in "I" allotments would be managed to improve the areas to good or better condition.

Once the areas were improved to good condition, they would be incorporated into the grazing systems for the allotment on a limited basis. The short-term result of this action would be elimination of approximately 34 AUMs of available forage for livestock. Some percentage of this total would be available in the long term through the AMP process.

An additional total of 1,658 acres of riparian vegetation would be improved to good or better condition through the AMPs developed for the "I" allotments. The result of this action would be an increase in forage available for livestock grazing. The increase in available AUMs for livestock grazing that would result from this action is included in the above total of increased AUMs from AMP development. This improvement would require a longer time to occur than the improvement due to fencing and exclusion of grazing.

Existing data were used to predict future changes in ecological condition and livestock adjustments due to monitoring. As discussed in the analysis of the effects on vegetation for Alternative D, trends in ecological condition in the Medicine Bow grazing EIS area would be expected to improve in the long term under this alternative. The amount of forage available to livestock under this alternative would increase in the long term to 185,905 AUMs from the present 161,464 AUMs.

Conclusion: The long-term availability of forage for livestock grazing would be expected to increase to 185,905 AUMs under Alternative D. Table LVGR-AP-6 in the Livestock Grazing appendix shows the estimated adjustment in authorized use, by allotment, that would result from management actions for livestock grazing in the long term.

A total of 1,035 additional AUMs would be available in the long term as a net result of management actions for lands, minerals, and forestry, together with the exclusion of livestock from riparian areas and wildlife crucial winter range. Therefore, the total long-term amount of forage available for livestock would be expected to be 186,940 AUMs. This figure is 16% above active preference and 27% above the five-year average licensed use level.

Management actions for lands and minerals under Alternative D would reduce available forage in the Divide and Seven Lakes EIS areas by about 1% over the next 20 years.

Effects on Mineral Resources

Leasable Minerals-Coal

Effects on coal resources from coal management under Alternative D would be the same as those of Alternative C. Under Alternative D, 64,595 acres containing approximately 519.1 million tons of coal would be available for further consideration for leasing. The availability of this coal would allow the BLM to respond to demand more efficiently than at present. It also would improve flexibility to respond to changes in demand.

Leasable Minerals-Oil and Gas

Management Actions for Cultural Resources/Natural History

The effects of the cultural resources and natural history programs on oil and gas under Alternative D would be the same as those described for Alternative C. Management actions to protect paleontological and historical values in the Como Bluff area could hinder timely oil and gas development.

Management Actions for Lands

Effects of the lands program under Alternative D would be similar to those of Alternative C. Over the next 20 years, some of the 10,000 acres of public land that would be transferred from federal ownership could be subject to the effects from split estate that are discussed under "Assumptions for Minerals."

Management Actions for Minerals (Oil and Gas)

Effects of surface protection and seasonal stipulations were discussed under "Assumptions for Minerals." The magnitude of the effects is difficult to predict, but generally it would depend on the acreage covered by restrictions. The acreages listed as affected by lease stipulations in table 1 in chapter 2 are not additive because the areas overlap. However, the figures indicate that slightly more acreage would be affected under Alternative D than under Alternative A. Acreage covered by seasonal restrictions would be the same as in Alternative A at 1.4 million acres, or 28% of the federal mineral estate in the planning area.

Management Actions for Wildlife and Fisheries

No acreage would be closed to leasing under Alternative D to protect wildlife values. The raptor concentration areas proposed for ACEC designation would be intensively managed to maintain nesting raptor productivity. The Sand Hills area would be managed to protect habitat values. Impacts of management actions for areas proposed for ACEC designation would be the same as those discussed under Alternatives B and C. Restrictions would adversely affect oil and gas recovery by limiting exploration, which could cause untimely and inefficient development of petroleum resources.

Locatable Minerals

Management Actions for Cultural Resources/Natural History

Effects on locatable minerals activity from cultural resources and natural history actions would be the same as those described for Alternative C. The requirement for plans of operations in the Como Bluff ACEC (1,760 acres) could inhibit timely and efficient mineral development.

Management Actions for Lands

Under Alternative D, 10,000 acres of public land would be transferred from federal ownership over the next 20 years. If such actions resulted in split estate, some of this acreage could be subject to the problems in development of locatable minerals described under "Assumptions for Minerals."

Management Actions for Minerals (Locatable Minerals)

Under Alternative D, 821,507 acres of existing withdrawals would be revoked, as in Alternative C. A total of 81,493 acres of existing withdrawals would be continued, and new withdrawals would be proposed for 1,570 more acres. Mineral development would not be permitted on the withdrawn lands; however, the effect on the availability of locatable minerals would be minor because of the relatively small amount of federal mineral estate that would be withdrawn (less that 2%).

Management Actions for Wildlife and Fisheries

Under Alternative D, 35,800 acres would be designated ACECs to protect wildlife values. Plans of operation would be required on these areas. The necessity of filing plans of operations could inhibit timely and efficient development of locatable minerals.

Conclusion: Under Alternative D, the BLM's flexibility to respond to changes in the demand for coal would be improved over present management. As in Alternative C, all areas with development potential would be available for leasing consideration.

Surface protection restrictions would affect the availability of oil and gas on slightly more acreage than under present management. Seasonal restrictions would affect the availability of oil and gas in approximately 28% of the planning area, the amount that is affected under present management.

Mineral exploration and development would be affected by management requirements on 37,560 acres designated ACECs. Mineral entry would be prohibited on 83,063 acres.

Effects on Recreation

Introduction

The objective for recreation management under Alternative D would be similar to that of Alternative A–to increase the availability of recreation opportunities in the planning area. This would be accomplished through consolidation of landownership on lands with high recreational value, pursuit of access to such acres, and provision of additional recreational developments.

Management Actions for Livestock Grazing

As in Alternative B, improvement of 85 miles of aquatic habitat under Alternative D would enhance opportunities for fishing in small streams and beaver ponds.

Management Actions for Minerals

Leasable Minerals-Coal

Except in the Atlantic Rim area, development of coal under Alternative D generally would not have an adverse effect on recreation resources. The analysis of effects on wildlife for this alternative indicates that elk and mule deer could be displaced by development of the Atlantic Rim coal. If this happened, the quality of hunting would be reduced in the vicinity of Atlantic Rim.

Development of the Atlantic Rim coal would not have an adverse effect on the Continental Divide National Scenic Trail. The coal area lies west of the east rim of the Continental Divide. Bridger Pass, where the divide turns to the northeast, is less than a mile from the coal area. The remaining length of the divide in the vicinity (about 4 miles) is more than a mile away. While draglines, dust, and smoke would be visible to trail users, the impact from this would be minimal, and these coal activities would be visible for only a short distance.

Leasable Minerals-Oil and Gas

Effects on recreation from oil and gas activity under Alternative D would be the same as those described for Alternative B. Recreation sites and the North Platte River would be protected from surface disturbance caused by oil and gas activities.

Locatable Minerals

Locatable minerals actions under Alternative D would have both positive and negative effects on recreation. A positive effect would result from withdrawal of existing and planned recreation sites from mineral entry. This would protect the BLM's investments in public improvements and the recreation opportunities available there. While the likelihood of mining within most of the recreation sites is low, withdrawing them from all forms of mineral entry is the only sure way of giving these sites long-term protection from mineral development.

Under this alternative, none of the land adjacent to the North Platte River would be withdrawn from mineral entry. Of main concern are areas that have high value for recreation and moderate or high potential for locatable minerals. Two stretches of river meet these criteria-1,550 acres adjacent to Bennett Peak and 795 acres adjacent to Big Creek. Both stretches are important for fishing. (The quality of the experience in these areas is measured not only in the quality of the fishing but equally in the quality of the natural setting in which the activity occurs.)

There is moderate potential for locatable minerals along the North Platte in the areas mentioned above. While there are currently no mining claims in either the Bennett Peak area or the Big Creek area, there is no assurance that interest by mining concerns will remain low; thus, there is no assurance that the quality of the recreation experience will remain intact in the long term.

Management Actions for Recreation

The effects on recreation from management of ORV use under Alternative D would be similar to those described for Alternative A. In the Sand Hills management area, ORV use would be limited to existing roads and trails. Hunters (the primary recreation users) would be allowed vehicle access through the area as at present. Under Alternative D, emphasis would be placed on mitigation of impacts and rehabilitation of specific problem areas.

Recreation-related impacts due to consolidation of landownership under this alternative would be the same as those described for Alternative B-enhanced opportunities for hunting and fishing.

Conclusion: Alternative D generally would enhance recreation resources. However, lands along the North Platte River would not be protected from locatable mineral activities. While the likelihood of mineral activity along the river may be low, there would be no assurance under this alternative that the quality of the river's recreation opportunities would be maintained in the long term. The quality of hunting might be reduced if big game populations declined because of coal development in the Atlantic Rim area.

Effects on Soils, Water, and Air

Introduction

Assumptions about impacts presented in this analysis are included in "Assumptions for Soils, Water, and Air."

Management Actions for Forestry

The effects of actions for forest management under Alternative D would be the same as those described for Alternative C. Intensive forest management on 19,159 acres (17% of the forestlands) would lead to acceleration of soil erosion, local degradation of air quality, and degradation of water quality, but proper timber harvest techniques would keep these effects to a minimum. In the long term, forest management would help ensure good vegetative cover, which would reduce accelerated erosion and improve water quality.

Restricted harvest on 6,707 acres (6% of the forestlands) would have minimal effects. On 309 acres (less than 1% of the forestlands) where harvesting would be prohibited, the decline in health and vigor of the forest could increase erosion and degrade water quality in the long term if wildfire should occur.

Management Actions for Livestock Grazing

Under Alternative D, management would be designed to enhance livestock grazing while balancing economic use and management to enhance watershed and riparian values. The development of new AMPs on "I" allotments and planned range improvements would benefit soil, water, and air resources by reducing accelerated erosion and degradation of water quality in "I" allotments.

Ecological condition would not improve under Alternative D in other allotments with a downward trend. Vegetative cover generally would be decreased as condition continued to decline. This would lead to reduced water quality and increased rates of accelerated erosion.

Planned range improvements would be designed with full consideration of soil, water, and air resources. This would maintain soil productivity and water quality. These improvements could reduce accelerated soil erosion and enhance water quality by controlling stream flows, making them less erosive and protecting streamside vegetation.

Livestock would be temporarily excluded from 67 acres of riparian areas until condition improved sufficiently to allow limited seasonal grazing. In addition, 1,658 more acres of riparian areas would be improved through grazing systems, and fencing of reservoirs would improve 56 acres. Vegetative cover should increase in some of these areas where accelerated erosion is not too far advanced, albeit more slowly because of the continued grazing. In the long term, this would lead to decreased rates of accelerated erosion, which would enhance water quality by reducing salt and sediment loading.

Livestock would be permanently excluded from 1,120 acres of important wildlife habitats. Vegetative cover would increase in those areas. This would lead to decreased rates of accelerated erosion, which would enhance water quality by reducing salt and sediment loading.

As in Alternative B, any changes in kind of livestock from sheep to cattle would be accompanied by appropriate management actions to maintain or improve riparian condition. This would improve stream bank stability, thereby reducing stream bank erosion and improving water quality.

Management Actions for Minerals

Leasable Minerals-Coal

Effects on soils, water, and air from coal development under Alternative D would be the same as those described for Alternative C. Development of the 3,650 acres that would be available on Atlantic Rim would have a high potential to cause unacceptable rates of accelerated erosion. To a great extent the effects on soil, water, and air resources would depend on the location mined and the method of development. If the drainages with steeper slopes were developed, reclamation would be difficult. This would cause accelerated erosion over the long term. The potential for effects on other areas that would be available for consideration for leasing would be similar to those discussed under "Effects of Management Actions Common to All Alternatives."

Leasable Minerals-Oil and Gas

Surface disturbance from oil and gas exploration and development would be restricted on as much as 1,095,210 acres of steep slopes, riparian areas, perennial surface water, historic trails, VRM Class I and II areas, recreation sites, sag grouse leks, and high priority wildlife habitat. Surface disturbance from oil and gas exploration and development would be restricted seasonally on 1.4 million acres. The effect of protection of soils and water and maintenance of air quality would be similar to that described for Alternative A, but on a larger acreage.

Locatable Minerals

Approximately 83,063 acres would be withdrawn from locatable mineral activities under this alternative. Effects would be similar to those discussed for Alternative A, but on a much smaller acreage. Withdrawal would prevent potential accelerated erosion and degradation of water and air quality that could result from these activities.

A total of 37,560 acres would be designated ACECs in this alternative, and plans of operations would be required for all but casual use on mining claims. This would provide for mitigation of effects on soils, water, and air quality from development of locatable minerals in the ACECs.

Management Actions for Wildlife and Fisheries

As in Alternative B, management actions for wildlife under Alternative D would protect riparian areas, improve vegetative cover, and reduce surface disturbance on 864,975 acres. This also would benefit soil, water, and air resources by restricting surface disturbance and reducing the potential for resulting accelerated soil erosion.

Conclusion: Many of the effects of Alternative D on soils, water, and air would be similar to those discussed for other alternatives, but the acreage affected would be different. Intensive forest management on 19,159 acres (17% of the forestlands) would lead to acceleration of soil erosion, local degradation of air quality, and degradation of water quality, but proper timber harvest techniques would keep these effects to a minimum. In the long term, forest management would help ensure good vegetative cover, which would reduce accelerated erosion and improve water quality.

Restricted harvest on 6,707 acres (6% of the forestlands) would have minimal effects. On 309 acres (less than 1% of the forestlands) where harvesting would be prohibited, the decline in health and vigor of the forest could increase erosion and degrade water quality in the long term if wildfire occurred.

Improvement in trend and vegetative cover in "I" category allotments would lead to decreased rates of accelerated erosion. A reduction in accelerated erosion would enhance water quality by reducing salt and sediment loading. In other allotments with a downward trend, vegetation condition would not improve, and this would lead to increased rates of accelerated erosion and reduced water quality.

Improvement of 1,120 acres of important wildlife habitats and 1,781 acres of riparian areas through grazing management actions would increase vegetative cover and lead to decreased rates of accelerated erosion. The improvement in riparian vegetation could occur somewhat slowly because of continued grazing during the improvement period. In the long term, reductions in salt and sediment loading would enhance water quality.

Changes in kind of livestock from sheep to cattle would be accompanied by management actions to improve riparian condition. These actions would improve stream bank stability, reduce stream bank erosion, and improve water quality.

Water and air quality would be maintained and unacceptable rates of accelerated erosion would be prevented in areas protected by surface disturbance restrictions (up to 1,095,210 acres) and by seasonal restrictions on oil and gas exploration and development (1.4 million acres).

Withdrawal of 83,063 acres from locatable mineral activities would prevent accelerated erosion and degradation of water and air quality from these activities. Requirements for plans of operations for all mining activity but casual use on 37,560 acres of designated ACECs would protect soils and water and maintain air quality.

Management actions for wildlife to protect riparian areas, improve vegetative cover, and reduce surface disturbance on 864,975 acres would restrict surface disturbance and reduce the potential for accelerated soil erosion.

Under Alternative D, 14,815 more acres would be available for consideration for coal leasing than under Alternative A. Development of the 3,650 acres that would be available on Atlantic Rim would have a high potential to cause unacceptable rates of accelerated erosion. The effects on soil, water, and air resources would depend largely on the location mined and the method of development. If the drainages with steeper slopes were developed, difficulty of reclamation could lead to accelerated erosion over the long term. Effects in other areas that would be available for consideration for leasing would be similar to those discussed under "Effects of Management Actions Common to All Alternatives."

As in all alternatives, installation of utility and transportation systems and other facilities would increase soil erosion, increase sedimentation during construction, and increase dust particulates in the air. Management actions for soils, water, and air in the Muddy Creek, Sage Creek, and Second and Third Sand Creeks watersheds would minimize potential soil compaction, removal of vegetative cover, sedimentation of streams, degradation of air quality, accelerated erosion, and contamination of groundwater in those areas.

Effects on Vegetation

Rangeland Vegetation

Under Alternative D, the vegetative resource would be managed to enhance livestock grazing while maintaining a balance between economic uses and management so that wildlife habitat, watershed, and riparian vegetation also would be enhanced. Vegetation condition would be improved on "I" category allotments through intensive grazing management. New AMPs would be developed and projects implemented in support of those AMPs.

Alternative D would result in an overall improvement of 5.2% in ecological condition in the Medicine Bow grazing EIS area in the long term. Changes in long-term condition and trend would be brought about by both short-term and long-term management actions. Long-term improvements in ecological condition and vegetation trend that would result from the management actions for the grazing EIS area are discussed below and are shown by allotment in table LVGR-AP-6 in the Livestock Grazing appendix.

Effects on vegetation in "M" and "C" category allotments under Alternative D generally would be the same as those described for Alternative A. Management problems considered insignificant on an allotment basis do occur within the "C" allotments, and they should be monitored; however, they are not addressed in this narrative. In the short and long terms, there would not be any great changes in the vegetation resource as compared to the existing situation.

Current levels of livestock grazing use would be continued until monitoring data could be collected. This would mean that management actions on "I" allotments would be deferred in the short term. The effects of this action and of implementing some projects before collection of monitoring data would be the same as those described for Alternative B. In the short term, areas with declining trends would continue in a downward trend, while those with static or upward trend would continue in their respective directions. Ecological condition in areas with a downward trend would be stabilized in the long term from adjustments in livestock grazing use that could be made after monitoring. These adjustments would achieve sustained-yield utilization levels.

The effect of eliminating livestock grazing on 1,120 acres of big game crucial winter range and other important habitats would vary, depending on (a) the characteristics of the critical area, (b) the length of time the closure would be enforced, and (c) the intensity of the livestock grazing pressure before the closure. An area in an upland position that exhibits a reduced species composition and decreased vigor, seed production, and seedling establishment could require five or more years after closure to respond if precipitation is low.

Grazing systems or AMPs would be developed for intensive management of 12,020 acres of big game crucial winter range to improve habitat condition. This would result in a slow improvement in ecological condition in those areas in the long term.

Spring grazing would not be deferred on "M" and "C" allotments under this alternative. Current conditions and trends would continue as at present.

The benefits of implementation of 55 AMPs and construction of projects in support of those AMPs on "I" allotments would be similar to those discussed for Alternative B. Additional benefits to the vegetative resource would result from seeding 11,500 acres of degraded sites. This action would establish desirable vegetation, which would lead to increased vegetative production and increased grazing capacities. It also would protect the soil from erosion and increase ground cover. Seedings, once established and used in conjunction with grazing systems, would provide the additional benefit of taking some of the grazing pressure off other highly productive native ranges.

Riparian Vegetation

The benefits of an accelerated management plan to protect and improve streams and critical riparian areas through fencing would be the same under Alternative D as under Alternative B, but on a smaller number of acres. Under Alternative D, only 67 acres would be improved through fencing. In addition, 1,658 more acres of riparian vegetation would be improved through the AMP process discussed above and in Alternative B.

The benefits of constructing reservoir fencing to exclude livestock grazing would be the same as under Alternative B.

Rare Plants

As in Alternative A, no effects on Gibben's beardtongue would be expected because the known population is fenced and a trend study is in place.

As in Alternative B, no effects on the population of persistent sepal yellowcress would be expected because of the BLM's efforts to coordinate with the Bureau of Reclamation on monitoring the population. The BLM also would coordinate with county weed and pest control districts on weed control proposals.

The Muddy Gap cushion plant community could possibly be affected by surface disturbance from ORV use, but the effect would not be likely to occur. The area could be disturbed by exploration and development of limestone deposits, but such disturbance is not considered likely since no claims have been filed on the area. The plant community would be monitored, and additional protective measures would be taken if monitoring indicated a need. This would help to ensure continued protection of the community.

Conclusion: Under Alternative D, the ecological condition and vegetation trend would be expected to improve over the grazing EIS area as a whole. Table LVGR-AP-6 in the Livestock Grazing appendix shows the estimated change in ecological condition by allotment that would result from all the management actions discussed above. The improvement in ecological condition over the grazing EIS area as a whole would be 5.2%.

A total of 1,781 acres of riparian vegetation would improve slowly over the long term through intensive management practices under this alternative. This is 46% of approximately 3,911 acres of riparian vegetation in the Medicine Bow grazing EIS area. Adverse effects on rare plants would not be expected to occur.

Effects on Visual Resources

The goal of visual resource management under Alternative D, as in Alternative A, would be to minimize adverse effects on visual resources while maintaining the effectiveness of land-use allocations.

As in Alternative A, surface disturbance from oil and gas activities would be restricted on 194,000 acres of VRM Class I and II areas under Alternative D. These are areas with high scenic values upon which development activity could have the most adverse impacts. Limitations on surface disturbance would help to preserve visual quality.

Effects on Wildlife and Fisheries

Introduction

The goal of the wildlife and fisheries program under Alternative D would be to continue present management actions under modified management plans. These plans would emphasize maintaining or improving wildlife habitat values and, where necessary, restricting conflicting activities that would jeopardize important habitat values or disturb species during critical periods. Typical impacts on wildlife from various types of activities are described in the Wildlife appendix.

Management Actions for Forestry

Impacts on wildlife and fisheries from forestry under Alternative D would be the same as those described for Alternative C. Short-term losses of big game habitat due to physical disturbance and human activity would be greater under Alternative D than under present management. In the long term, important habitat values would be maintained through maintenance of diversity in forest age class and habitat and application of forest wildlife habitat guidelines.

Management Actions for Livestock Grazing

The short-term benefits to the wildlife community under Alternative D would be limited because of the monitoring period that would be required to determine the current range conditions. Initiation of intensive management actions would lead to earlier benefits where problems are known to exist–for example, severely degraded riparian areas; areas where there is competition for forage between livestock and big game; or crucial winter ranges with interspecific competition among elk, mule deer, and bighorn sheep.

Long-term effects on wildlife from livestock grazing under Alternative D would be similar to those described for Alternative C; however, under Alternative D, enhancement of wetland and riparian areas and protection of sensitive wildlife values would be emphasized as much as enhancement of livestock grazing.

The effects on fisheries from Alternative D would be the same as those described for Alternative B. The overall effect would be positive. A total of 41.5 miles of trout stream habitat in "I" category allotments in the Medicine Bow grazing EIS area would be maintained or improved. Some new larger reservoirs would be constructed, so the potential positive effect of creation of more fisheries would be realized. Any changes in kind of livestock from sheep to cattle would be monitored and actions taken to maintain trout stream habitat.

In the rest of the planning area, Alternative D would have a positive effect on up to 43.5 miles of trout stream in "I" category allotments. No large new reservoirs would be likely, so the potential positive effect on fisheries (creation of new fisheries) would not be realized. Any change in kind of livestock from sheep to cattle could cause habitat degradation in some allotments.

Management Actions for Minerals

Leasable Minerals-Coal

Effects on wildlife from coal activity under Alternative D would be the same as those described for Alternative C.

Leasable Minerals-Oil and Gas

Effects on wildlife and fisheries from oil and gas activity under Alternative D would be similar to those described for Alternative A, with the following exceptions.

Standard protection requirements would be applied to 79,700 acres of raptor concentration areas to maintain their value to nesting raptors. Two of those raptor concentration areas totaling 27,500 acres, Shamrock Hills and Seminoe, also would be designated ACECs. This would further focus management toward the maintenance of these important nesting areas. Four other raptor concentration areas would continue to be protected with seasonal stipulations (see map 62).

The Baggs elk crucial winter range would not be designated an ACEC; however, disturbance would be spatially and temporally managed as in Alternative B to maintain the integrity of the crucial winter range and minimize adverse impacts on the elk herd.

Locatable Minerals

The impacts on wildlife and fisheries from locatable minerals activity under Alternative D would be similar to those described for Alternative C. The difference is that plans of operations for surface disturbance related to locatable minerals would be required only on 27,500 acres of raptor concentration areas that would be designated ACECs. This would ensure consideration of raptor habitat in the two most important raptor concentration areas, Shamrock Hills and Seminoe.

Management Actions for Recreation

Effects on wildlife and habitat from recreation management would be the same under Alternative D as under Alternative A except in the Sand Hills area. ORV use in that area would be restricted to existing roads and trails as in Alternative A; however, rehabilitation and mitigative measures would be carried out in specific problem areas.

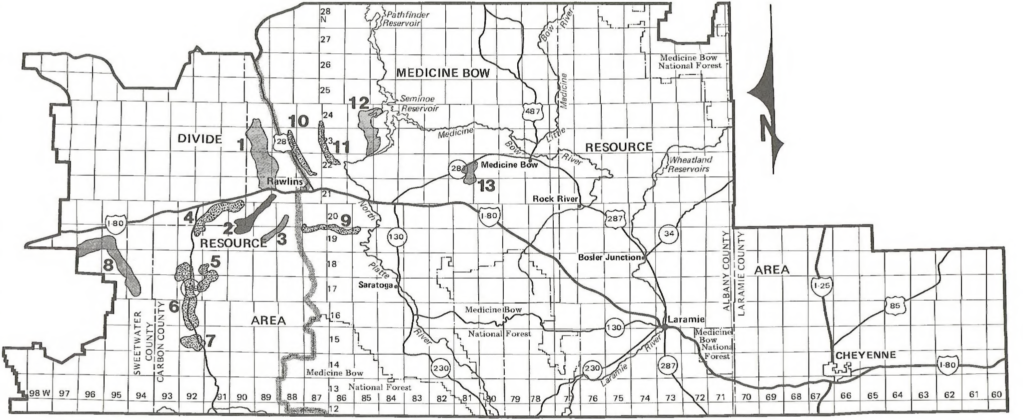
As in Alternative A, ORV use designation under this alternative would be of limited value to the wildlife resource in the long term because new roads would continue to be established in connection with energy and mineral exploration and development. These new roads, once established, would qualify as existing roads. ("Typical Impacts from Oil and Gas" in the Wildlife appendix contains more detailed information.)

Management Actions for Wildlife and Fisheries

Management objectives for wildlife and fisheries under Alternative D would be the same as those for Alternative A. Management actions and impacts would be the same as those described for Alternative B, with the following exceptions.

The number of acres or miles on which management actions would be carried out, and the HMP areas in which these actions would be planned, are described under Alternative C. These management actions would provide long-term benefits to a wide variety of fish and wildlife species.

Two raptor concentration areas, Shamrock Hills and Seminoe (27,500 acres), would be designated ACECs. In the ACECs, plans of operations would be required for locatable



▨ Protective Stipulations

▨ Protective Stipulations/ACEC

▨ Seasonal Protective Stupulations

▨ Seasonal

1 Shamrock Hills

2 Red Rim

3 Atlantic Rim

4 Cherokee

5 Doty Mountain

6 Muddy Creek

7 Blue Gap

8 Delaney Rim

9 Bolten Rim

10 Brown Canyon Rim

11 Platte Divide

12 Seminoe

13 Hanna

0 10 20 30 40 50

Scale In Miles

Map 62

RAPTOR CONCENTRATION AREAS

ALTERNATIVE D - PROTECTIVE STIPULATIONS

Medicine Bow-Divide Resource Management Plan

mineral activities, and intensive spatial and temporal management of disturbance would be applied to reduce adverse effects on nesting raptors and their habitat.

In the other raptor concentration areas that would not be designated ACECs (72,500 acres), the focus on maintaining the integrity of nesting habitat would be less clear and intense. Seasonal restrictions on 20,300 acres would protect the birds from disturbance during breeding/nesting activities. Plans of operations would not be required for locatable minerals activities. With the application of surface disturbance restrictions on the remaining 52,200 acres, there would be fewer adverse impacts on raptor populations than under present management.

If coal development should occur on Atlantic Rim, the BLM would recommend that the WGFD elk population objective levels on the Baggs elk crucial winter range be adjusted to the level supportable by available habitat. This could mean a substantial reduction in the population and thus a consequential long-term adverse effect on the elk herd.

Effects on wildlife in the Sand Hills area from ORV use would be similar to those of Alternative C, but ORV use would be limited to existing (rather than designated) roads. Some problem areas such as blowouts would be reclaimed. This reclamation would improve wildlife habitat in specific areas. However, it would not offset the long-term detrimental effects on elk and mule deer that could be expected as energy-related roads (and therefore ORV use) continued to increase.

Under Alternative D, the 12-acre white pelican colonial nesting island would not be designated an ACEC. If monitoring data indicated that disturbances were having a detrimental effect on the nesting colony, actions would be implemented to protect the colony and its habitat from such disturbance. This would help to ensure the continued viability of the nesting colony. However, the apparent decline in this species nationally is believed to be due partly to the sensitivity of white pelicans to predation and human disturbance. If protective actions were not implemented until effects were evident from monitoring data, disturbance thresholds could be exceeded. This could jeopardize the continued existence of the colony.

Conclusion: Under Alternative D, impacts on wildlife from forestry management actions would be the same as for Alternative C. Livestock grazing actions also would be similar to those of Alternative C except that additional benefits would be realized by a variety of species from added emphasis on enhancement of wetland/riparian areas. The overall effects of livestock grazing on fisheries would be positive over the planning area as a whole. A total of 85 miles of trout stream would be maintained or improved in "I" category allotments.

The Shamrock Hills and Seminoe raptor concentration areas would be designated as ACECs with emphasis on spatial or temporal management of disturbance. All other raptor concentration areas would be managed spatially and/or temporally to minimize disturbance. Under ACEC designation, plans of operation would be required for locatable mineral entry in the Shamrock Hills and Seminoe raptor concentration areas. This would reduce cumulative adverse impacts on nesting raptors. Disruption of the integrity of these important nesting areas and physiological disturbance of nesting pairs would be reduced.

Potential adverse effects on the Baggs elk herd would be minimized through spatial and temporal management of disturbance.

The Sand Hills area would be managed under an ACEC designation. Mule deer, elk, and other species would benefit from spatial and temporal management of disturbance related to oil and gas development and locatable mineral entry. However, ORV use would continue to be allowed on existing roads and trails, and this could result in cumulative adverse effects for wildlife should energy and mining activities increase the number of roads.

As in Alternative A, the continued viability of the nesting colony of white pelicans would be enhanced under this alternative. However, delays in implementing protective actions until monitoring indicated a need could jeopardize the colony's continued existence.

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Chapter Five

Consultation and Coordination

CHAPTER 5

CONSULTATION AND COORDINATION

INTRODUCTION

The Medicine Bow-Divide RMP/EIS was prepared by an interdisciplinary team of specialists from the Medicine Bow and Divide resource areas, the Rawlins District Office, and the Wyoming State Office of BLM. In-depth reviews for accuracy and consistency were provided by both the district office and state office staffs.

Consultation, coordination, and public involvement have occurred throughout the process through scoping meetings, informal meetings, individual contacts, newspaper releases, and *Federal Register* notices.

Writing of the document began in the summer of 1986. Much of the analysis, research, inventory, public involvement, and interagency coordination was done before that time.

PUBLIC PARTICIPATION

A public participation plan was prepared to ensure that the public would have numerous opportunities to be actively involved in the planning and environmental processes. Both formal and informal input have been encouraged and utilized.

Two *Federal Register* notices have been published, and a notice of intent to prepare a plan was published February 28, 1986.

A total of 282 letters were mailed to permittees with "C" category allotments on February 24, 1986. Permittees were informed of the criteria used in categorizing their allotments and given the opportunity to discuss the proposed classification. On April 30, 1986, a letter was mailed to 44 permittees informing them of consultation on "I" and "M" allotment categorizations. Operators have been contacted in person and in writing to discuss the categorization of their allotments.

A news release of June 6, 1986, requested information from the public on coal data. The Rawlins District Advisory Council met on June 25, 1986, and discussed the Medicine Bow-Divide RMP/EIS. Council members have been kept apprised of the progress of the plan, and their comments and recommendations have been solicited.

A *Federal Register* notice published August 12, 1986, and a news release issued the same date notified the public of six open house meetings to be held in late August and early September. At the same time, a letter requesting public input and outlining planning issues and criteria was mailed to approximately 700 agencies, organizations, and individuals on our mailing list. The letter also was an invitation to attend public meetings from August 25 through September 3 to discuss planning issues and criteria and alternatives. A total of 58 people attended the public meetings.

On September 24, 1986, a letter was mailed to approximately 940 agencies, organizations, and individuals on the mailing list to inform them of the participation at the public meetings, the issues discussed, and the alternatives considered.

Generally, topics discussed at the meetings covered all the issues and proposed management actions. Some comments dealt with oil and gas and with issues related to other minerals, such as coal. Allotment categorization and grazing fees were discussed, and there were comments dealing with erosion and livestock grazing in riparian areas. A number of individuals were concerned about access as it relates to recreation, land exchanges/sales, and wilderness.

There was significant interest in possible landownership adjustment, timber sales, and access issues. There was some interest in timber harvest in the Shirley Mountains, and persons attending the meetings expressed general satisfaction with the current management of the wild horse program.

A total of 46 written or telephoned comments had been received as of October 1, 1986. That total does not include comments received at the public meetings. The comments received were from many sectors of the public.

A total of 46 written or telephoned comments had been received as of October 1, 1986. That total does not include comments received at the public meetings. The comments received were from many sectors of the public.

Formal and informal meetings have been held with many members of the ranching and minerals communities, conservation groups, and other interest groups and agencies. A list of respondents and their concerns is on file in the offices of the Medicine Bow and Divide resource areas.

As part of the ongoing activity in consultation and coordination, the BLM is preparing a biological assessment for threatened and endangered species. The BLM will share the results of the assessment with the U.S. Fish and Wildlife Service, as required by section 7 of the Endangered Species Act of 1973, as amended.

CONSISTENCY

Coordination with other agencies and consistency with other plans was accomplished through continuous communication and cooperative efforts between the BLM and involved federal, state, and local agencies and organizations.

The Wyoming Governor's Clearinghouse will be supplied with numerous copies of this draft document for review to ensure consistency with the state's ongoing plans. The RMP team has reviewed county land-use plans to ensure consistency. The BLM also has coordinated with Bureau of Reclamation managers of the Seminoe Reservoir and with officials of the Medicine Bow National Forest.

Local groups have been consulted to ensure that all parties are aware of the plan and objectives.

AGENCIES AND ORGANIZATIONS CONSULTED

The RMP/EIS team has consulted with and/or received input from numerous organizations during the development of the document. The following list is representative of the agencies that have indicated an interest in the Medicine Bow-Divide RMP/EIS and that have been contacted during the planning process. This list is not inclusive. A complete list is on file at the office of the Medicine Bow and Divide resource areas.

Federal Agencies

- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of Commerce
- Department of Defense
  - U.S. Air Force
- Department of Energy
- Department of Housing and Urban Development
- Department of the Interior
  - Bureau of Indian Affairs
  - Bureau of Land Management (other offices)
  - Bureau of Mines
  - Bureau of Reclamation
  - Fish and Wildlife Service
  - Geological Survey
  - National Park Service
  - Office of Surface Mining
- Department of Transportation
- Environmental Protection Agency
- Tennessee Valley Authority

Federal Elected Officials

- Office of Senator Alan Simpson
- Office of Senator Malcolm Wallop
- Office of Representative Dick Cheney

State Agencies, Commissions, and University

- Archives, Museums, and Historical Department
- Department of Environmental Quality
- Game and Fish Department
- Geological Survey
- Highway Department
- Oil and Gas Conservation Commission
- Public Lands Commission
- Public Lands and Farm Loan District
- Recreation Commission
- State Engineer's Office
- State Historic Preservation Officer
- State Planning Coordinator's Office
- University of Wyoming (various departments)

State Elected Officials

Wyoming Governor's Office

State senators and state representatives from Albany, Carbon, Laramie, and Sweetwater counties

Counties and Cities

Cities and towns of Bairoil, Cheyenne, Encampment, Hanna, Laramie, Medicine Bow, Rawlins, Saratoga, and Wamsutter

County commissioners, county planning commissions, and weed and pest control districts of Albany, Carbon, Laramie, and Sweetwater counties

DISTRIBUTION

In addition to the agencies and offices listed above, notices, requests for comments, and copies of this document have been sent to businesses, organizations, interest groups, and individuals. Copies of the RMP/EIS are available for review in the BLM offices at Rawlins, Lander, Worland, Rock Springs, Cheyenne, and Casper and in the county libraries in Albany, Carbon, Laramie, and Sweetwater counties.

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As the nation's principal conservation agency, the Department of the Interior has basic responsibilities for most of our nationally owned public lands and natural resources. This responsibility includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses the nation's energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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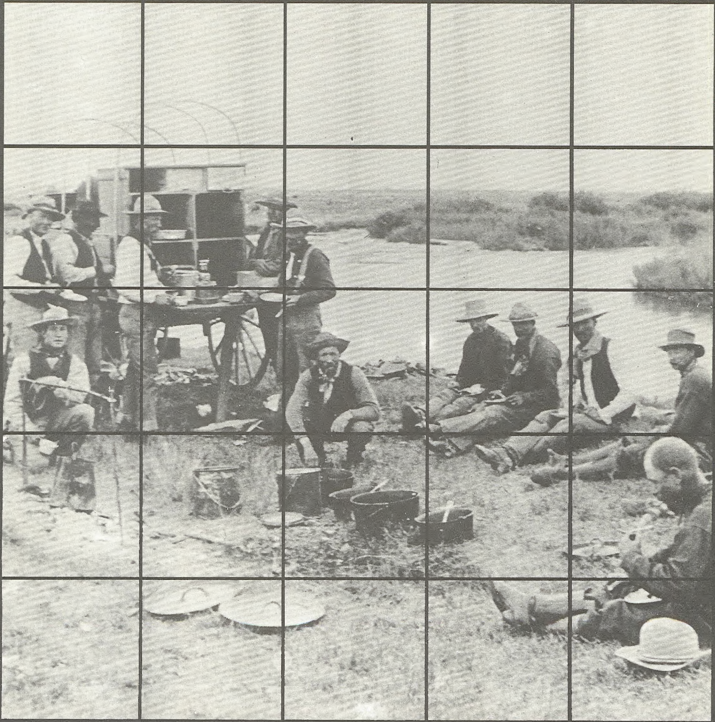

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